NEW YORK STATE MEDICAL ASSOCIATION

FOUNDED 1884

TRANSACTIONS

OF THE

NEW YORK STATE MEDICAL ASSOCIATION.

COMMITTEE ON PUBLICATIONS.

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JOHN G. TRUAX, M. D., of New York County.
E. D. FERGUSON, M. D., of Rensselaer County, *ex-officio.*

ALFRED L. CARROLL, M. D.,

CHAIRMAN, AND EDITOR OF THE TRANSACTIONS.

TRANSACTIONS

OF

THE NEW YORK STATE MEDICAL ASSOCIATION,

FOR THE YEAR 1888.

VOLUME V.

EDITED FOR THE ASSOCIATION

BY ALFRED LUDLOW CARROLL, M. D.,

OF RICHMOND COUNTY.

CONCORD, N. H.:
Republican Press Association.
NEW YORK: J. H. VAIL & CO.
1889.

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OFFICERS AND COUNCIL FOR 1887–'88.

PRESIDENT.

JOHN CRONYN, M. D., Buffalo, Fourth District.

VICE-PRESIDENTS.

FIRST DISTRICT, BYRON DE WITT, M. D., Herkimer County.
SECOND DISTRICT, ROBERT SELDEN, M. D., Greene County.
THIRD DISTRICT, CHARLES W. BROWN, M. D., Chemung County.
FIFTH DISTRICT, EDWIN BARNES, M. D., Dutchess County.

SECRETARY.

E. D. FERGUSON, M. D., Troy, Rensselaer County.

TREASURER.

J. H. HINTON, M. D., 41 West Thirty-Second St., New York City.

DIRECTOR OF THE LIBRARY.

J. W. S. GOULEY, M. D., New York County.

MEMBER OF THE COUNCIL AT LARGE.

CHARLES A. LEALE, M. D., New York County.

ELECTED MEMBERS OF THE COUNCIL.

FIRST DISTRICT, IRA H. ABELL, M. D., Jefferson County.
" " HENRY N. PORTER, M. D., Oneida County.
SECOND DISTRICT, THOMAS WILSON, M. D., Columbia County.
" " ROBERT C. McEWEN, M. D., Saratoga County.
THIRD DISTRICT, H. O. JEWETT, M. D., Cortland County.
" " WILLIAM FITCH, M. D., Tompkins County.
FOURTH DISTRICT, S. T. CLARK, M. D., Niagara County.
" " JOHN S. JAMISON, M. D., Steuben County.
FIFTH DISTRICT, JOHN J. TRUAX, M. D., New York County.
" " A. L. CARROLL, M. D., Richmond County.

COMMITTTEE OF ARRANGEMENTS FOR 1887–'88.

JOHN CRONYN, President,

E. D. FERGUSON, Secretary,

Ex-officio members of the committee.

GLOVER C. ARNOLD, Chairman.

C. ELLERY DENISON, Secretary.

E. S. F. ARNOLD,	S. B. WYLIE McLEOD,
ALFRED L. CARROLL,	AUGUSTUS D. RUGGLES,
JOHN W. S. GOULEY,	JOHN SHRADY,
FRANK GRAUER,	E. H. SQUIBB,
JOHN H. HINTON,	ISAAC E. TAYLOR,
CHARLES A. LEALE,	JOHN G. TRUAX,
J. R. MACGREGOR,	WILLIAM T. WHITE.

OFFICERS AND COUNCIL FOR 1888–'89.

The Sixth Annual Meeting will be held in New York City, beginning the fourth Wednesday in October, 1889.

PRESIDENT.

WILLIAM T. LUSK, M. D., 47 E. 34th St., New York City.

VICE-PRESIDENTS.

FIRST DISTRICT, S. H. FRENCH, M. D.,
Amsterdam, Montgomery County.
SECOND DISTRICT, R. C. McEWEN, M. D.,
Saratoga Springs, Saratoga County.
THIRD DISTRICT, ELIAS LESTER, M. D.,
Seneca Falls, Seneca County.
FOURTH DISTRICT, THOMAS D. STRONG, M. D.,
Westfield, Chautauqua County.

SECRETARY.

E. D. FERGUSON, M. D., Troy, Rensselaer County.

TREASURER.

J. H. HINTON, M. D., 41 W. 32 St., New York City.

DIRECTOR OF THE LIBRARY.

J. W. S. GOULEY, M. D., 324 Madison Avenue, New York City.

MEMBER OF THE COUNCIL AT LARGE.

ISAAC E. TAYLOR, M. D., The Sherburne,
5th Avenue and 36th St., New York City.

ELECTED MEMBERS OF THE COUNCIL.

FIRST DISTRICT, DOUGLAS AYRES, M. D.,
Fort Plain, Montgomery County; term expires 1890.
" " IRA H. ABELL, M. D.,
Antwerp, Jefferson County; term expires 1889.

SECOND DISTRICT, J. B. HARVIE, M. D.,
Troy, Rensselaer County; term expires 1890.
" " THOMAS WILSON, M. D.,
Claverack, Columbia County; term expires 1889.
THIRD DISTRICT, J. H. CHITTENDEN, M. D.,
Binghamton, Broome County; term expires 1890.
" " H. O. JEWETT, M. D.,
Cortland, Cortland County; term expires 1889.
FOURTH DISTRICT, R. J. MENZIE, M. D.,
Caledonia, Livingston County; term expires 1890.
" " SIMEON T. CLARK, M. D.,
Lockport, Niagara County; term expires 1889.
FIFTH DISTRICT, ALFRED L. CARROLL, M. D.,
New Brighton, Richmond County; term expires 1890.
" " JOHN G. TRUAX, M. D.,
17 E. 127th St., New York City; term expires 1889.

OFFICERS OF THE BRANCH ASSOCIATIONS FOR 1889.

FIRST OR NORTHERN BRANCH.

The Fifth Annual Meeting will be held at Rome, Oneida County, on the second Tuesday in July, 1889.

OFFICERS.

PRESIDENT, S. H. FRENCH, M. D., Amsterdam, Montgomery County.
SECRETARY, EZRA GRAVES, M. D., Amsterdam, Montgomery County.

EXECUTIVE COMMITTEE.

WILLIAM GILLIS, M. D., Fort Covington, Franklin County.
ISAAC DE ZOUCHE, M. D., Gloversville, Fulton County.
THOMAS McGANN, M. D., Wells, Hamilton County.
W. D. GARLOCK, M. D., Little Falls, Herkimer County.
IRA H. ABELL, M. D., Antwerp, Jefferson County.
ALBERT A. JOSLIN, M. D., Martinsburg, Lewis County.
H. M. LEACH, M. D., Glen, Montgomery County.
G. ALDER BLUMER, M. D., Utica, Oneida County.
BYRON DE WITT, M. D., Oswego, Oswego County.
GUY REUBEN COOK, M. D., Louisville, St. Lawrence County.

SECOND OR EASTERN BRANCH.

The Fifth Annual Meeting will be held at Saratoga Springs, Saratoga County, on the fourth Tuesday in June, 1889.

OFFICERS.

PRESIDENT, R. C. McEWEN, M. D., Saratoga Springs, Saratoga County.
SECRETARY, C. H. BURBECK, M. D., Troy, Rensselaer County.

EXECUTIVE COMMITTEE.

S. PETERS, M. D., Cohoes, Albany County.
L. C. DODGE, M. D., Rouse's Point, Clinton County.
THOMAS WILSON, M. D., Claverack, Columbia County.

E. F. EDGERLY, M. D., Moriah Centre, Essex County.
ROBERT SELDEN, M. D., Catskill, Greene County.
Z. ROUSSEAU, M. D., Troy, Rensselaer County.
R. C. McEWEN, M. D., Saratoga Springs, Saratoga County.
JAMES REAGLES, M. D., Schenectady, Schenectady County.
H. F. KINGSLEY, M. D., Schoharie, Schoharie County.
JAMES FERGUSON, M. D., Glens Falls, Warren County.

THIRD OR CENTRAL BRANCH.

The Fifth Annual Meeting will be held at Cortland, Cortland County, on the third Tuesday in June, 1889.

Officers.

President, ELIAS LESTER, M. D., Seneca Falls, Seneca County.
Secretary, LEROY J. BROOKS, M. D., Norwich, Chenango County.

Executive Committee.

J. G. ORTON, M. D., Binghamton, Broome County.
W. R. LAIRD, M. D., Auburn, Cayuga County.
C. L. SQUIRE, M. D., Elmira, Chemung County.
H. C. LYMAN, M. D., Sherburne, Chenango County.
B. KENYON, M. D., Cortland, Cortland County.
W. B. MORROW, M. D., Walton, Delaware County.
G. BIRDSALL, M. D., N. Brookfield, Madison County.
H. L. ELSNER, M. D., Syracuse, Onondaga County.
B. A. CHURCH, M. D., Oneonta, Otsego County.
P. B. ROPER, M. D., Alpine, Schuyler County.
ELIAS LESTER, M. D., Seneca Falls, Seneca County.
W. L. AYER, M. D., Owego, Tioga County.
WILLIAM FITCH, M. D., Dryden, Tompkins County.

FOURTH OR WESTERN DISTRICT.

The Fifth Annual Meeting will be held at Rochester, Monroe County, on the second Tuesday in May, 1889.

Officers.

President, THOMAS D. STRONG, M. D., Westfield, Chautauqua County.
Secretary, WM. H. THORNTON, 574 Niagara St., Buffalo, Erie County.

Executive Committee.

B. C. WAKELY, M. D., Angelica, Alleghany County.
V. A. ELLSWORTH, M. D., East Otto, Cattaraugus County.

WILLIAM CHACE, M. D., Mayville, Chautauqua County.
F. F. HOYER, M. D., Tonawanda, Erie County.
A. P. JACKSON, M. D., Oakfield, Genesee County.
G. H. JONES, M. D., Fowlerville, Livingston County.
R. M. MOORE, M. D., Rochester, Monroe County.
S. T. CLARK, M. D., Lockport, Niagara County.
JAMES H. ALLEN, M. D., Gorham, Ontario County.
H. C. TOMPKINS, M. D., Knowlesville, Orleans County.
N. M. PERRY, M. D., Troupsburgh, Steuben County.
L. S. SPRAGUE, M. D., Williamson, Wayne County.
G. M. PALMER, M. D., Pike, Wyoming County.
D. M. SMITH, M. D., Penn Yan, Yates County.

FIFTH OR SOUTHERN DISTRICT.

The Fifth Annual Meeting will be held in Brooklyn, Kings County, on the fourth Tuesday in May, 1889.

Officers.

President, WILLIAM T. LUSK, M. D., 47 E. 34th St., New York City.
Secretary, E. H. SQUIBB, M. D., P. O. Box 94, Brooklyn, Kings County.

Executive Committee.

J. G. PORTEOUS, M. D., Poughkeepsie, Dutchess County.
WILLIAM McCOLLOM, M. D., Brooklyn, King's County.
J. G. TRUAX, M. D., New York, New York County.
W. B. EAGER, M. D., Middletown, Orange County.
WILLIAM YOUNG, M. D., Cold Spring, Putnam County.
EDWIN WEBB, M. D., Hampstead, Queens County.
F. U. JOHNSTON, M. D., New Brighton, Richmond County.
WILLIAM GOVAN, M. D., Stony Point, Rockland County.
W. D. WOODEND, M. D., Huntington, Suffolk County.
T. W. BENNETT, M. D., Jeffersonville, Sullivan County.
H. VAN HOEVENBERG, Kingston, Ulster County.
N. C. HUSTED, M. D., Tarrytown, Westchester County.

LIST OF PRESIDENTS AND VICE-PRESIDENTS FROM THE FOUNDING OF THE ASSOCIATION.

1884.

PRESIDENT.

HENRY D. DIDAMA, M. D., Onondaga County, Third District.

VICE-PRESIDENTS.

FIRST DISTRICT, J. MORTIMER CRAWE, M. D., Jefferson County.
SECOND DISTRICT, TABOR B. REYNOLDS, M. D., Saratoga County.
FOURTH DISTRICT, B. L. HOVEY, M. D., Monroe County.
FIFTH DISTRICT, NATHANIEL C. HUSTED, M. D., Westchester County.

1885.

PRESIDENT.

* JOHN P. GRAY, M. D., Oneida County, First District.

VICE-PRESIDENTS.

SECOND DISTRICT, WILLIAM H. ROBB, M. D., Montgomery County.
THIRD DISTRICT, JOHN G. ORTON, M. D., Broome County.
FOURTH DISTRICT, JOSEPH C. GREENE, M. D., Erie County.
FIFTH DISTRICT, * JOSEPH C. HUTCHISON, M. D., Kings County.

1886.

PRESIDENT.

E. M. MOORE, M. D., Monroe County, Fourth District.

VICE-PRESIDENTS.

FIRST DISTRICT, WILLIAM GILLIS, M. D., Franklin County.
SECOND DISTRICT, H. C. VAN ZANDT, M. D., Schenectady County.
THIRD DISTRICT, * FREDERICK HYDE, M. D., Cortland County.
FIFTH DISTRICT, J. G. PORTEOUS, M. D., Dutchess County.

* Deceased.

1887.

President.

ISAAC E. TAYLOR, M. D., New York County, Fifth District.

Vice-Presidents.

First District, JOHN P. SHARER, M. D., Herkimer County.
Second District, L. C. DODGE, M. D., Clinton County.
Third District, GEORGE W. AVERY, M. D., Chenango County.
Fourth District, DARWIN COLVIN, M. D., Wayne County.

1888.

President.

JOHN CRONYN, M. D., Erie County, Fourth District.

Vice-Presidents.

First District, BYRON DE WITT, M. D., Oswego County.
Second District, ROBERT SELDEN, M. D., Greene County.
Third District, CHARLES W. BROWN, M. D., Chemung County.
Fifth District, EDWIN BARNES, M. D., Dutchess County.

LIST OF FELLOWS IN ATTENDANCE AT THE FIFTH ANNUAL MEETING IN NEW YORK CITY,

Held October 9, 10, and 11, 1888.

FIRST DISTRICT.

FRANKLIN COUNTY.

William Gillis, Fort Covington.

FULTON COUNTY.

Isaac de Zouche, Gloversville.

HERKIMER COUNTY.

W. D. Garlock, Little Falls.
John P. Sharer, Little Falls.

ONEIDA COUNTY.

Charles Munger, Knoxboro'.
George G. Phelps, Utica.

OSWEGO COUNTY.

E. Frank Marsh, Fulton.

SECOND DISTRICT.

ALBANY COUNTY.

J. P. Marsh, Green Island.
A. T. Van Vranken, West Troy.

COLUMBIA COUNTY.

H. Lyle Smith, Hudson.
Thomas Wilson, Claverack.

GREENE COUNTY.

George Conkling, Durham.
Robert Selden, Catskill.

RENSSELAER COUNTY.

C. S. Allen, Greenbush.
W. L. Allen, Greenbush.
R. B. Bontecou, Troy.
C. H. Burbeck, Troy.
W. C. Cooper, Troy.
W. S. Cooper, Troy.
E. D. Ferguson, Troy.
J. B. Harvie, Troy.
C. E. Nichols, Troy.

SARATOGA COUNTY.

Charles S. Grant, Saratoga Springs.
T. B. Reynolds, Saratoga Springs.

SCHENECTADY COUNTY.

Robert Fuller, Schenectady.
Charles Hammer, Schenectady.
Geo. E. McDonald, Schenectady.

WARREN COUNTY.

G. R. Martine, Glens Falls.

THIRD DISTRICT.

BROOME COUNTY.

J. H. Chittenden, Binghamton.
C. W. Greene, Chenango Forks.
F. W. Putnam, Binghamton.

CHEMUNG COUNTY.

Charles W. Brown, Elmira.
Frank W. Ross, Elmira.
C. L. Squire, Elmira.
T. H. Squire, Elmira.

CORTLAND COUNTY.

George D. Bradford, Homer.
H. O. Jewett, Cortland.
J. D. Tripp, Virgil.

DELAWARE COUNTY.

Orson M. Allaben, Margaretville.

ONONDAGA COUNTY.

Nathan Jacobson, Syracuse.

OTSEGO COUNTY.

J. K. Leaning, Fly Creek.

TIOGA COUNTY.

George M. Cady, Nichols.

FOURTH DISTRICT.

ALLEGHANY COUNTY.

A. W. Cottrell, Whitesville.

CHAUTAUQUA COUNTY.

William Chace, Mayville.
Thomas D. Strong, Westfield.

ERIE COUNTY.

Rollin L. Banta, Buffalo.
George A. Barwell, Buffalo.
John Cronyn, Buffalo.
George E. Fell, Buffalo.
C. C. Frederick, Buffalo.
W. H. Heath, Buffalo.
A. A. Hubbell, Buffalo.
W. H. Thornton, Buffalo.
W. S. Tremaine, Buffalo.

GENESEE COUNTY.

A. P. Jackson, Oakfield.

LIVINGSTON COUNTY.

R. J. Menzie, Caledonia.

MONROE COUNTY.

B. L. Hovey, Rochester.
E. M. Moore, Rochester.
E. M. Moore, Jr., Rochester.
R. M. Moore, Rochester.

NIAGARA COUNTY.

William Q. Huggins, Sanborn.

STEUBEN COUNTY.

John S. Jamison, Hornellsville.

WAYNE COUNTY.

N. E. Landon, Newark.

FIFTH DISTRICT.

DUTCHESS COUNTY.

Guy Carleton Bayley, Poughkeepsie.
Edwin Barnes, Pleasant Plains.
G. H. Codding, Amenia.
G. T. Howland, Tivoli.
Irving D. Le Roy, Pleasant Valley.
John M. Julian, Moore's Mill.
J. G. Porteous, Poughkeepsie.

KINGS COUNTY.

George W. Baker, Brooklyn.
J. C. Bierwirth, Brooklyn.
A. H. Brundage, Brooklyn.
Joseph Creamer, Brooklyn.
Henry F. Risch, Brooklyn.
William G. Russell, Brooklyn.
Avery Segur, Brooklyn.
Nelson B. Sizer, Brooklyn.
W. F. Gardiner, Brooklyn.
N. W. Leighton, Brooklyn.
T. Mortimer Lloyd, Brooklyn.
William McCollom, Brooklyn.
E. J. C. Minard, Brooklyn.
N. L. North, Brooklyn.
Susan L. Pray, Brooklyn.
E. H. Squibb, Brooklyn.
E. R. Squibb, Brooklyn.
C. O. H. Steinke, Brooklyn.
J. D. Sullivan, Brooklyn.
J. R. Vanderveer, Brooklyn.
George Wieber, Brooklyn.

NEW YORK COUNTY.

E. S. F. Arnold, New York.
Glover C. Arnold, New York.
William R. Ballou, New York.
James Bathgate, Morrisania.
Charles S. Benedict, New York.
Hermann M. Biggs, New York.
Nathan Bozeman, New York.
Nathan G. Bozeman, New York.
Joseph D. Bryant, New York.
Ellery Denison, New York.
C. Ellery Denison, New York.
Ellsworth Eliot, New York.
Austin Flint, New York.
Wm. H. Flint, New York.
Guido Furman, New York.
John P. Garrish, New York.
J. W. S. Gouley, New York.
Frank Grauer, New York.
George T. Harrison, New York.
John H. Hinton, New York.
Dwight L. Hubbard, New York.
Geo. E. Hubbard, New York.
S. T. Hubbard, New York.
E. G. Janeway, New York.
Charles A. Leale, New York.
Robert Lewis, New York.
Anna Lukens, New York.
William T. Lusk, New York.
P. J. Lynch, New York.
James R. MacGregor, New York.
S. B. W. McLeod, New York.
J. A. McLochlin, New York.
George H. McTammany, New York.
Thomas H. Manly, New York.
G. C. H. Meier, New York.
R. L. Miranda, New York.
John Murphy, New York.
Robert Newman, New York.
John Parsons, Kings Bridge.
P. B. Porter, New York.
S. S. Purple, New York.
A. D. Ruggles, New York.
John Shrady, New York.
John W. Small, New York.
J. Lewis Smith, New York.
I. E. Taylor, New York.
John G. Truax, New York.
C. P. Tucker, New York.
Joseph G. Wallach, New York.
Albert T. Weston, New York.
W. T. White, New York.
C. S. Wood, New York.

ORANGE COUNTY.

William B. Eager, Middletown.

RICHMOND COUNTY.

Alfred L. Carroll, New Brighton.
F. U. Johnston, New Brighton.
W. C. Walser, Port Richmond.

ROCKLAND COUNTY.

William Govan, Stony Point.

SUFFOLK COUNTY.

William D. Woodend, Huntington.

ULSTER COUNTY.

August Hühne, Rondout.
Frederick Hühne, Rondout.
Stanley M. Ward, Ellenville.

WESTCHESTER COUNTY.

Edward F. Brush, Mount Vernon.
William L. Wells, New Rochelle.
N. C. Husted, Tarrytown.
Edward A. Williamson, Westchester.
R. J. Southworth, Yonkers.

SUMMARY BY DISTRICTS OF FELLOWS IN ATTENDANCE.

First District,	7
Second District,	21
Third District,	14
Fourth District,	21
Fifth District,	94
Total,	157

DELEGATES FROM OTHER MEDICAL ORGANISATIONS AND INVITED GUESTS IN ATTENDANCE.

Massachusetts Medical Society.

J. F. ALLEQUE ADAMS, M. D., Pittsfield.

Pennsylvania State Medical Society.

THEODORE P. SIMPSON, M. D., Beaver Falls.

Invited Guests.

C. D. ALTON, M. D., Hartford, ... Connecticut.
N. L. BRITTON, Ph. D., School of Mines, Columbia Coll., New York City.
W. H. CARMALT, M. D., New Haven, . . . Connecticut.
CHARLES A. DOREMUS, M. D., Ph. D., Bellevue Hosp. Med. Coll., New York City.
M. MICHEL, M. D., Charleston, ... South Carolina.
CHARLES B. NANCREDE, M. D., Philadelphia, Pennsylvania.
CHARLES T. PARKES, M. D., Chicago, . . . Illinois.
ELWYN WALLER, Ph. D., School of Mines, Columbia Coll., New York City.
WILLIAM C. WILE, M. D., Danbury, . . . Connecticut.

ADDRESS OF WELCOME AND REPORT OF THE COMMITTEE OF ARRANGEMENTS.

By Glover C. Arnold, M. D., of New York County, Chairman of the Committee.

October 9, 1888.

Gentlemen: The Committee of Arrangements extend to you a hearty welcome to the fifth annual meeting of the New York State Medical Association. Your committee fully appreciate that in your being present many have been obliged to undergo much fatigue and inconvenience, and trust that you will be so interested with the programme that you will be amply repaid.

From the first meeting of the Association, the many and varied essays that have been presented and read have considered and elucidated much in the field of medical science. For the past three years the discussions of the propounded questions on the special subjects investigated have been most interesting and instructive, showing, on the part of those participating, a zeal and desire that our standard shall never fall.

In our programme of the proceedings of this meeting, already sent by mail to each of the Fellows and guests, it will be seen that there are thirty-eight titles, comprising seventy-six scientific papers. Of these, there will be three addresses, in addition to the President's Address,—one on Surgery, by Dr. William H. Carmalt, of New Haven, Conn.; one on Obstetrics, by Dr. George T. Harrison, of New York county; and one on Medicine, by Dr. John Shrady, of New York county.

Three subjects will be offered for discussion. As heretofore, a Fellow has been appointed to open the discussion on

each of these subjects, and to prepare a paper in which he shall propound questions to be answered in writing by Fellows of the Association and invited guests. The discussion on Medicine will be opened this afternoon by Dr. Alfred L. Carroll, of Richmond county; the discussion on Surgery will be opened to-morrow afternoon by Dr. J. W. S. Gouley, of New York county; and the discussion on Obstetrics will be opened on the afternoon of the third day of the session, by Dr. Carlton C. Frederick, of Erie county.

In addition there will be twelve essays presented, making in all seventy-six scientific contributions. These seventy-six contributions come from five geographical districts of this state, from our own state proper, and from three sister states, in the following proportion:

The First District sends	2
Second "	4
Third "	16
Fourth "	13
Fifth "	30
State of Connecticut sends	2
State of Illinois "	2
State of New York "	3
State of Pennsylvania "	4
	76

In these five districts, Fellows of the Association from sixteen counties contribute essays in the following proportion:

Third	District,	Broome	County,	2
"	"	Chemung	"	6
"	"	Chenango	"	3
Fourth	"	Erie	"	9
First	"	Herkimer	"	1
Fifth	"	Kings	"	2
Fourth	"	Monroe	"	3
Second	"	Montgomery	"	1
Fifth	"	New York	"	27

Fourth District,	Niagara County,	. . . .	1
Third "	Onondaga "	. . . .	4
" "	Otsego "	. . . .	1
Second "	Rensselaer "	. . . .	2
Fifth "	Richmond "	. . . .	1
Second "	Schenectady "	. . . .	1
" "	Warren "	. . . .	1
			65

The contributions from our own and from our sister states are as follows:

State of Connecticut, ...	2
" Illinois, ...	2
" New York, ...	3
" Pennsylvania, ...	4
	11

Total, 76.

These seventy-six scientific contributions, classified in accordance with their subjects, are as follows:

20 on medicine.
11 on obstetrics and gynaecology.
19 on pathology.
26 on surgery.
—
76

In order that there may be sufficient time afforded for the presentation of these many contributions, your committee have provided that there shall be three night sessions in addition to the three regular morning and afternoon sessions. The morning sessions will be opened at nine o'clock, and devoted to the business of the Association, to addresses, and to the reading of papers. The afternoon sessions will be opened at one o'clock, and will be devoted exclusively to the discussions on Medicine, Surgery, and Obstetrics. The night ses-

sions will be opened at 7:30 o'clock, when the discussions will be continued, and such papers presented whose titles may not have been received previous to issuing the programme.

Since the distribution of the official programme, the following changes and additions have been made:

"Does the menstrual flow originate in the tubes? The act of menstruation viewed from an inverted uterus." By E. J. Chapin Minard, M. D., of Kings county.

"Traumatic Gangrene." By T. H. Manly, M. D., of New York county.

"Seaside Hospitals for Sick Children." By Charles A. Leale, M. D., of New York county.

"Report of a case." By B. L. Hovey, M. D., of Monroe county.

Dr. J. Lewis Smith, of New York county, will speak on "Diphtheritic Paralysis," and not on "The Treatment of Diphtheria."

Dr. Isaac E. Taylor, of New York county, has changed the title of his paper to "Inversion of the Uterus after Somatic Death."

PRESIDENT'S ANNUAL ADDRESS—THE MEDICAL PROFESSION AND THE PUBLIC.

By John Cronyn, M. D., of Erie County.

October 9, 1888.

Gentlemen: When you surprised and honored me last autumn by electing me to the presidency of this Association, I had scarcely turned my face homeward, ere, remembering one of the duties of my new office, I began mentally to shape the address it might be my pleasure to deliver to you within a twelvemonth. Of two subjects urged upon me by my own inclination, and what seemed to be expediency, one was selected in which I felt that we all would find at least a strong debatable interest; and what I intended to be a short paper on the "Unity of Poisons in Disease" was then begun. But my long illness and subsequent cares interfered too seriously with certain experiments and verifications which I desired to offer for your consideration, together with others previously prepared,—too seriously to permit the finishing of my task with a thoroughness worthy of the theme.

These obstacles, daily observation, and recent events of moment to the medical world have influenced me in abandoning, for the time, a technical question for one that is chiefly important in its ethical bearings. The few remarks, then, put in some form almost at the last hour—and for which I beg your indulgence—I have headed "The Medical Profession and the Public."

Strictly speaking, perhaps, only preachers, actors, musicians, orators, come into direct relation with "the public;" and, as doctors deal with *individuals* directly and indirectly, not with masses—except, we will say, when acting on a board of health—the term may seem a misnomer in this conjunction.

But if the profession does not address itself to this great public, the public most assuredly does to the profession, and especially through that universal medium of popular expression—the press. Now, in what regard is the profession held by the public in question?—that is, by *all* people, lettered and unlettered, who are not *of* the profession—the people who simply and literally "honor the physician for the need they have of him"? I should make answer, that, with all the disposition on the part of modern thought to exalt, even unduly, the physical sciences, it is more than doubtful whether the greatest of them occupies, in the general estimation, the position it deserves, both by reason of its importance to humanity and its admitted achievements in the field of scientific investigation. Correct principles, safe methods, and unselfish aims are assuring watchwords on the standard of a scientific body no less than upon the banner of a political party. But what if the principles be misunderstood, the methods ignorantly lauded, or again as ignorantly reviled, the unselfishness of aims derided? And how shall that body serve effectually the outside masses when all that it may do is hampered on the one hand by unreasoning skepticism, and on the other by a blind trust as apt to be imposed upon by charlatanism as to be helped by science and genuine skill?

If my view at the outset assume a pessimistic hue, I must remind you that we are to leave entirely out of sight the appreciation that scientific men have for scientific progress in general, and for one another's theories and practice in particular, whether in their little quarrels or their less frequent agreements—out of sight also the full reliance and generous respect with which individual patients regard a tried and conscientious physician, and which is one of the consoling experiences of a practitioner's career.

I remember, moreover, that the attention given by the press to conventions and representative associations of medical men demonstrates the importance attached to their work. But we are not considering just now what, in the non-professional mind, may be called the profession in the abstract,—the body

investigating, theorising, arguing,—and its real place in the ranks of science, but the profession in the concrete, at the bedside—the body acting, serving—and its work as seen from the people's point of view; and we are concerned with "the public" as it looks at the profession. This public is quite indifferent to pathogenesis and pathological progress. Germ theories of disease, ptomaines and leucomaines, or the primitive ideas which ascribed the ills to which flesh is heir to the influence of "unlucky stars" or evil spirits, are all alike to men who only seek relief from pain, freedom from the bonds of sickness. By whatever remote knowledge it comes about, or immediate agent of drugs, or surgeon's knife, healing is the doctor's occupation; and in the actual practice of the art only has the profession any tangible hold upon the public.

Where shall I find my witnesses to prove that this "public" is not respectful, is not just, of course is not generous, in its attitude toward the profession upon which it makes such large demands? Where? Among individuals who discuss the medical treatment applied to themselves or their friends; too often among members of the profession, who, not over sure of their own skill, echo the skepticism of outsiders, the sarcasm or depreciatory jests with which, betimes, some wit is wont to celebrate a medical failure; and, most of all, in the pages of our modern inspired writings—the newspapers—which mould public opinion, and express it also. The press, but the other day, watched with the doctors at the bedside of the late Emperor of Germany, and beside our own Sheridan, as it did, too, some years before, the closing days of two other lives dear to the American nation. It gave to the world, with more or less accuracy, the daily record of the sick men's condition no less than of the doctors' opinions and treatment, nor omitted to report the contradictions therein sometimes contained. It made the most of the unhappy criminations and recriminations with which, in certain instances, medical men scandalised non-professional onlookers. Did we not read then?—do we not now?—and is it pleasant reading? the questions from intelligent sources, if, after all, medical science

has made much progress? if the doctors deliberately lied to the public, wilfully deceived it, or if they really knew what was the matter with their distinguished patients, what to do for them, or what would be the end? The public insists upon being taken into the profession's confidence when the health of an important personage is in the balance, and in a lesser degree is anxious to know the truth when smaller lives are at stake.

Here and there a physician may refuse, very properly, to impart *any* professional information concerning his patient to outsiders, but the fact remains that the many are willingly or unwillingly influenced in this matter by the spirit of the age, forced, indeed, on occasions; and the surgeon, the alienist, the physician, practises or testifies not only before the troubled gaze of kinsfolk, the sympathetic eyes of brother scientists, or the judicial ones of a court, but within sight and hearing of a multitude equipped with that dangerous "little learning" which constitutes its "right" to express an opinion, swayed in its judgment and sympathies by accidents, by prejudices, by the wit of a lawyer or by the jeer of a scribe.

A singular fact in connection with the popular estimate of the "learned professions" is the fair conception formed of the province and power of both divinity and law, and the failure to at all appreciate the scope and limitations of medicine. Another is the popular manner of separating principles and persons in the three callings. Beyond doubt a man's personality counts for a great deal in any and every walk of life, and nowhere is conduct of more importance than in the medical profession; but the failings and foibles of a divine may be ridiculed or condemned, while his critics never dream of charging his creed with the faults of the man. A lawyer lies, a judge is bribed, a witness perjured, but no one therefor impugns the majesty of the law. The doctor, on the contrary, seems to be taken *en masse*, if I may so express it. He errs once or many times; he disagrees with one or more fellow-practitioners,—and forthwith we hear the cry, "It is all

guess-work—they do not, cannot know;" and "they" means the profession.

> "Trust not the physician;
> His antidotes are poison, and he slays
> More than you rob,"

our public exclaims with Timon, when now and again—alas, too often!—the art of healing does not heal. A distinguished member of the profession, whose intimate association with a famous case has weighted him with a large share of the responsibility of calling forth the recent storms of animadversion which in the secular press have assailed the personal honor and professional pride of medical men, you may remember two or three years ago, in an article published, I think, in an English periodical, and entitled "Is Medicine a Progressive Science?" wrote that the art of healing had certainly not progressed proportionately to the art of killing; and that "scoffers may even be found who maintain that it has not advanced a single step since the days of Hippocrates. Pessimistic views of this kind," he says, "are not uncommon among clever people who are enlightened enough to see the shortcomings of medical science, without having sufficient knowledge to appreciate either the difficulties in the way or the manner in which they are met." He thought, however, at that time the opposite tendency more fashionable, "the ever-widening area of conquest achieved by science in the dark realm of disease being the theme of constant jubilation in the lecture-room and in the press." His later experiences, I am sure, have qualified him to add to his reflections upon this subject.

But it is not with the position of medicine in the company of the sciences, nor with Dr. MacKenzie's treatment of the question, "Is it progressive?" that I have to deal; rather with his observations, as they support my own remarks regarding the popular estimate of the profession, and to show that he must have been impressed by the prevalence of pessimistic over optimistic views of medicine, since he thought

it worth while to enumerate so fully all that the art has lost of evil and gained of good, and to plead so earnestly that, in the perfecting of its functions of alleviation and prevention alone, "it deserves supremely well of humanity," and is entitled to take its stand as a progressive science.

Neither is it my purpose to detail, before an assemblage like this, the physician's claim to the gratitude of society, nor to blame the public for a lack of proper sentiment. I wish merely to formulate a grievance that *does*, and should *not*, exist at this stage of the history of medicine, and to suggest a remedy for it.

Now I insist that the want of confidence in, misapprehension of, and irreverence for, the claims and labors of the profession, and, moreover, the *manner* of expressing these states of feeling, offend the dignity of the profession and impair its usefulness. And impair its usefulness! Ay, "there's the rub!" It would matter little to men pursuing unselfishly and seriously a serious calling whether the world dubbed them knaves and fools, or prophets and sons of prophets, providing the evil reputation could not imperil, or the good enhance, the success of their undertakings. Granted, that the present attitude of "the public" is hurtful to its own interests as well as to the profession, we must set about removing *this* obstacle to the fullest accomplishment of great ends, as we do other obstructions.

While putting on paper the thoughts I have been trying to express to you, my attention was directed to a short editorial in a September number of the "New York Medical Journal," which showed that recent occurrences had started the writer upon a train of thought parallel to my own. He deplores the mischievous smattering of medical knowledge with which non-professional writers mislead the public, and the tendency of the latter to criticise medical men and methods with an assurance worthy of superior information. "What the laity need," he wisely says, "is not to be more thoroughly instructed in medical science, but to be taught to distinguish between the true and the false, between the charlatan and the honest,

conscientious physician." "This task," he continues, "will take more than one generation, and will only be accomplished through the influence of the profession, who, it must be confessed, too often encourage the ignorance which they ought to enlighten." As to precisely how the laity may be taught the invaluable lesson of discernment, and what the degree of enlightenment the general public could safely bear, the writer and I might not agree. Indeed, as he himself complains, people of excellent sense and more than ordinary education are often so "singularly warped in their judgment when they consider medical matters," that I am tempted to wish it were possible at this day to silence the curious and critical after Cardan's method, who advises his pupil, when "asked any irrelevant question by a patient, to reply that Galen forbids him to answer that question."

What a world of weariness were spared had we in modern times a name thus potent to conjure with! That the remedy for the evil mentioned is entirely in the hands of the profession there can be no doubt. It begins and ends there, with the character and work of each individual physician. Whatever limits time and circumstances may put to the enlightenment of the public, that of the profession must be bounded only by the horizon of possibility, and in its fullest meaning this enlightenment is at once the elevation of the profession and the source of its power over the public. So far, indeed, as a higher standard of general education and a more exacting system of special training can bring within the range of the medical student's appreciation the importance of his calling, the complex nature of its demands upon him as a man and a "scientist," something has been done of late years toward securing a larger measure of the desired enlightenment, and a "survival of the fittest" in the profession. But I should go *back* of the sternest medical schooling, earlier than the preliminary classical and scientific training which prepares the mind for its subsequent life-work, and still farther decimate the ranks of future aspirants to professional honors. Doctors should be called of heaven! Our profes-

sion, in my opinion, demands preëminently certain qualities of mind which, if lacking, cannot be supplied by *other* qualities, though these be equally high and as indispensable in their proper field of action. Education may develop them more or less perfectly, but nature gives them: they are not acquired. Like the poet—a thousand times more than the poet—the physician is "born, not made." I concede that a minimum of inclination with a maximum of cultivation may produce admirable results; not, however, perfect ones.

In the *selection* of a calling, even more than in a native disposition for it, heredity seems to me to count a great deal. A *taste* for military life, or the stage, or the professions, or the mechanical arts, is apt to find its origin in remote ancestral influence; but too often the *pursuit* of either is rather determined by the inheritance of a name than of a talent. Again: the wishes of parents, surroundings, ambition more or less lofty, sometimes love of the chosen calling,—love, the noblest and strongest motor in human affairs,—will divert a man from the work in life for which nature primarily fitted him. All these influences are felt in the medical profession no less than in others. But genius, education, ambition, and love of the profession cannot make the man a perfect physician if the quality of his genius be not medical. This is why so often profound scholarship, medical learning, experience, and sympathy stand powerless by the bedside, while help reaches the sufferer through the skill of some humble practitioner who has received the least possible aid from classical training, and who holds, probably, unorthodox views of our latest scientific theories, but is equipped with that order of mind I speak of, strengthened by experience, and supported very often, but not always, by another trait, of which I shall speak later as the *second* of the two positive and primary qualifications, absolute prerequisites in men who would enter the profession.

When we hear of a *legal* mind, a *religious* mind, a *poetical* mind, a *statesmanlike* mind, we understand clearly what is implied thereby, and feel that it is less a condition owing

itself to cultivation, than a constitutional tendency to which we refer. Why not, then, a *medical* mind? What distinguishes the latter from other kinds of mental organisations? I should answer, its *swiftness* of action—its power of immediate perception, rapid analysis, quick deduction. Add to this what other gifts may go to make up an intellectual completeness—so much the better for the possessor; take it *from* a combination of all other mental qualifications, and you may have a man of genius practising medicine, but he will not have a medical mind, and he will not be in the true sense of the word a successful physician. Nature intended him for another vocation.

Of all men the doctor must jump to conclusions, their degree of correctness, of course, depending upon the greater or less cultivation of the peculiar powers alluded to. Remember, always, that we are considering the medical man at the bedside—the profession as it approaches nearest to the public. The scientific mind is not necessarily a rapid one, and there is place in the laboratory and in the study for the man of theories and the book-maker, for the deliberate work of pathological researches and therapeutical discoveries. There, in part, the arms, offensive and defensive, are fashioned, finely tempered, and tried as far as may be, which science then puts at the command of the swift-thinking, swift-acting practitioner.

Compared with his brethren of the other "learned professions," I have mentioned one disadvantage under which the medical man labors. At the bedside he feels both himself and his patient the victims of another. The lawyer knows that his client's interests demand more time in which to produce witnesses or gather further testimony; he asks a postponement of the trial; the jury bring an adverse decision; he appeals to a higher court, and appeals again. Theology is an exact science, and in the administration of his spiritual prophylactics and remedies the clergyman is guided by certain fixed principles which his patient recognises as well as he. If he have a difficult case of conscience to deal with, there are final authorities to whom he may turn; and right

intentions are factors taken cognisance of in the domain of the supernatural. But the doctor cannot ask for a stay of proceedings. If he be tardy in his diagnosis, the sick man, perchance, is already beyond the reach of any "herb o' grace," and good intentions will not heal physical ailments. While he is searching his memory for the record of some parallel case; while he is doubting, deliberating, his patient dies,—and from death there is no appeal! When, happily, it is health, not disease, which seeks his practised judgment, scarcely less immediate must be its action.

The power, then, of seeing and thinking *quickly* is a *sine qua non* in the mental constitution of the would-be physician. The second indispensable equipment which the student must bring to the pursuit of this calling is the faculty of reverence—*not*, we all know, a distinguishing characteristic of the present generation;—reverence not solely for the achievements of medical science, but for its possibilities and its limitations; reverence for all *true* science—not science "run wild, like a planet broken loose from its celestial system."

"A medical philosopher," says Cardinal Newman in one of his university lectures, "who has so simply fixed his intellect on his own science as to have forgotten the existence of any other, will view man, who is the subject of his contemplation, as a being who has little more to do than to be born, to grow, to eat, to drink, to walk, to reproduce his kind, and to die."

The physician's reverence, then, must be broad in its wise deference; must extend to persons as well as to principles; must take note of ills for which the pharmacopoeia can suggest no remedies, of mysteries for which time holds no solution. Granted, that it is by no means so easy to ascertain the possession of these two prerequisites by the prospective physician as it is to determine his range of general learning, it is still possible, and certain to grow less difficult, as students themselves become more conscious of their capacity, and look upon their entrance into the profession in the light of a "vocation." When these native dispositions are fostered and developed

to the utmost, and march in the van of those other intellectual powers which are their best complement,—aided by the discipline of a liberal education, and utilised through the specific training of the most advanced medical schools,—then we have the type of the perfect physician; the man who, as far as it is possible in the science of medicine to be positive and confident, takes positively, confidently, and reverently into his hands the health and lives of his fellow-men.

When this is the type of the whole profession, we shall need to be troubled no more about the medical education of the laity; to deprecate the scoffs of the incredulous, or wax indignant over the ingratitude of those we have tried to serve and the mischievous interference of the medically unlearned. Let science make what progress it will, faith in the physician will be then, as now, an important factor in the influence of the profession with the public; but that faith being built on a firmer foundation, there will be no longer those outbreaks of complaint, of contempt, which are the natural results of misconceptions, over-sanguine expectations, and misplaced trust. I do not think it Utopian to dream that a complete understanding will be brought about some day between the profession and the public. You will all admit, surely, that it is to come through the multiplication of this type of the perfected medical man. "The skill of the physician shall lift up his head, and in the sight of men he shall be praised," says the Old Preacher. A consummation devoutly to be wished, less for the flattering comfort it may offer to the individual practitioner than for the strength it lends his heart and hand in the work the profession is doing for humanity.

A CASE OF ANAESTHESIA BY THE INHALATION OF NITROUS OXIDE, SUPPOSED TO BE THE FIRST ON RECORD.

By Oliver P. Hubbard, M. D., of New York County.

October 9, 1888.

It will be recollected that one of the suggestions of Sir Humphry Davy, in the year 1799, at the close of his investigations into the nature and physiological relations of nitrous oxide, was, that "in its extensive operation it appears capable of destroying physical pain, and may probably be used with advantage during surgical operations in which no great effusion of blood takes place." How this idea lay dormant, like gold in the mine, and how well this prediction has been realised, are known to the profession.

Its exhilarating power on inhalation has always been a familiar fact, and a reasonable caution has prevented exhibitors from exceeding this limit. In 1844 it was introduced by Dr. Wells into dentistry. The exhilarating effects of ether inhaled from a saturated handkerchief were well known to the students of Yale college, in 1826 and 1828, and it became the agent for little frolics on a leisure afternoon. Its surgical use dates from 1842 by Dr. Long of Georgia, and from 1846 by Morton.

Early in 1831 chloroform was discovered by Dr. Samuel Guthrie, in his laboratory, in the woods near Sackett's Harbor, N. Y., and subsequently by Soubeiran and Liebig, all original experimenters. The intoxicating effects of drinking the distillate of chloroform in alcohol were frequently exhibited in Guthrie's laboratory, and its introduction into the materia medica by the Drs. Ives of New Haven (at the suggestion of the elder Prof. Silliman), as "a diffusible and al-

ways grateful stimulant," in the same year, is recorded in Vol. XXI, pp. 406–408 of the "American Journal of Science and Arts."

Not till 1847 was its power as an anaesthetic, pure and simple, determined by Prof. James Young Simpson, M.D., of the University of Edinburgh, who introduced it into midwifery, and received therefor the abuse which is the usual reward of pioneers and discoverers.

The long intervals occurring between the common knowledge of these agents and their scientific use are paralleled in numerous discoveries.

Midway in time between Davy's suggestion as to the surgical use of nitrous oxide and its application by Wells, an event occurred which, had it been rightly interpreted, might have greatly hastened all the good results induced by anaesthesia.

I now propose to report to the Association a very early case of anaesthesia by nitrous oxide, with supporting testimony.

About sixty-seven years ago, Dr. Stockman, a German druggist of Utica, came to Rome, Oneida county, to exhibit the well known effects of its inhalation to a large number of people, on the evenings of November 5, 6, and 7, 1821, in the hotel and county court-house. On the first evening occurred an incident still fresh in my memory, which I have frequently cited to my classes. I have sought in vain to discover a record of a case of an earlier date. I have always intended to publish this case, and during these years, to fortify my own impressions, I have procured from living witnesses written confirmation of all my recollections.

My elder brother, William G. Hubbard, then sixteen years old, was present at Dr. Stockman's exhibition, and was one of those who took the gas. On the 14th of October, 1852, I wrote to him at Elgin, Ill., sending a copy of entries made at the time in my school journal, and adding, in substance, "Now I will relate from memory. On the first evening, when the exhibition was closed (the doctor saying there was

no more gas), and while many were standing around the fire talking over the occurrences, the doctor went into the dressing-room on the north, and found a young man lying on the floor close by the gasometer, entirely senseless.

"He had gone in stealthily, turned the stop-cock, and taken his fill, and here was the legitimate result—a case of complete anaesthesia, probably the first by this means ever authenticated.

"The alarm was great. Death seemed imminent, if not present. He was lifted with difficulty by two persons, one under each arm, and brought into the large ball-room; and, after long and anxious suspense, he came to his natural state unharmed. How long he had been under the influence of the gas could not be known, for 'the sweet was stolen.' Can you recall this singular incident and those connected with it?"

On the 22d he replies,—

I well remember old Dr. Stockman's performances at Rome. Your recollections, as far as you express them, agree almost exactly with my own. I do not know the name of the person; but that, I suppose, is not material. He was found as you mention, lying insensible, with his mouth applied to the faucet. No means were applied to restore him to consciousness. He was brought out into the ball-room, and a crowd immediately gathered around, watching the case.

After a few minutes his feet began to move slightly, with a gradually increasing motion to a very rapid one, evidently making an effort to dance. He was thus held up by his arms, with his feet flying like drumsticks, and gradually recovering the use of his limbs until he could dance alone.

He danced in this way until the effect of the gas had subsided, and then appeared entirely exhausted. No injurious or unpleasant effect was noticed, and after resting a while he appeared as usual.

In November, 1883, I addressed a similar letter to an early friend and schoolmate, Mr. William E. Wright, all his life a resident of Rome, to which he replied as follows:

In answer to your inquiries, I would say that I remember the incidents as to the lecture of Dr. Stockman at the hotel ball-room, not from personal presence, but from my father, who was there, of an attack made

upon him by Ephraim Smith when under the influence of the gas, who chased him from the ball-room into and through adjoining rooms until he came to himself again. I also remember the case of the person who became overcharged at the gasometer. I remember the lecture at the court-house from personal presence, and witnessed the agility of one man (McDonnell), who, under the influence of the gas, immediately started on a run upon the top rails of the right hand tier of rising slips up through the people therein, causing great excitement and fear by the people, who seized and held him by force until he came out of the gas influence. Finding himself so held, he was extremely mortified at his act and condition.

In August, 1887, wishing to confirm as far as possible the above recitals, I obtained from my cousin, Rev. Charles P. Grosvenor (Yale, 1827), of Pomfret, Conn., his recollections of these events, which occurred when he, a boy of sixteen, was at school in Rome. They coincide with the preceding; and he adds, "When thus held up and reviving, the young man would throw his feet as high as his head."

FORCED RESPIRATION.—HISTORY.—REPORT OF SIX CASES; APPARATUS; EFFECTS OF, ON NARCOTISED HUMAN SUBJECTS; ADAPTABILITY OF, IN CASES OF DROWNING OR SHOCK.

By George E. Fell, M. D., of Erie County.

October 9, 1888.

The term *forced respiration* being unfamiliar to many physicians, it may be well to give the reasons for its introduction into medical literature. The term *artificial respiration* has been applied to all artificial methods alike, as those of "Marshall Hall," "Sylvester," "Howard," and others, which depend for their success upon the movements of the limbs or body of the patient, supplemented usually by pressure of the thorax on the part of the physician; those in which tubes and mouth-pieces are used, and the air supplied by bellows of different forms; and the methods used on various animals in the physiological laboratory, in which the trachea is opened to supply the air for respiration. To the latter methods, which in operation required the forcing of air into the lungs by mechanical appliances, I have heretofore suggested the term *forced respiration*, to distinguish it from the ordinary methods of *artificial respiration*. The necessity for a distinctive term, and its appropriateness, will be conceded when it is noticed that respiration has been successfully carried on in man by these forcible means for many hours after artificial respiration has proved futile. The operations are so different in application that a distinctive term is absolutely required to prevent confusion.

History.—That comparatively little attention has been given to the subject of forced respiration upon man, may be accounted for by the general belief that artificial respiration,

as practised, would accomplish all that could be expected of the former. The opinion has also prevailed that more forcible measures than those used in artificial respiration would endanger the delicate lung tissue, or that the air vesicles might be ruptured. We may instance the very generally accepted Marshall Hall's "Ready Method in Asphyxia," wherein we find the use of bellows or any *forcing* instrument strongly condemned. Even in some of our "Visiting Lists," where we might expect to find only axiomatic phrases, this rule is laid down, with special stress upon the inadvisability of using any "forcing" measures or "instrument."

While forced respiration has been practised for many years, both here and abroad, upon animals in physiological laboratories, in vivisection experimentation, we have yet to ascertain that such application has taught it to be considered as of value in the saving of human life, the keeping up of respiration in the human organism, or as a means of resuscitation in asphyxia.

Can this be wondered at when high authorities inform us that artificial respiration will supply the blood with oxygen fully as well as forcible measures, or utter statements which convey just such impressions? In "Heath's Dictionary of Practical Surgery," under the head of "Suspended Animation," this statement appears: "It is important to bear in mind that artificial respiration is a purely mechanical act, and that, if efficiently performed, air must enter the lungs even of a corpse which is hopelessly dead."

In a short discussion which ensued upon the report of my first case, presented to a section of the International Medical Congress at Washington,[1] several physicians took the ground that the operation of forced respiration was not needed; that artificial respiration (Sylvester's method) would have accomplished as much. With such statements accepted and supported by the mass of surgical literature, it would be ridiculous to assert that the methods employed in the physiological laboratory were considered valuable in the resuscitation of

[1] September, 1887.

human beings in asphyxia. I will now defend the position, based upon my own experience, that artificial respiration, as practised by the Sylvester method, which is conceded to be one of the best, will fail to supply the lungs with air in sufficient quantity to keep up the action of the heart in deeply narcotised subjects, where forced respiration, in many cases, would prove entirely successful. In one of my cases the opinion was expressed by an experienced physician[1] who witnessed the operation, that the simple institution of artificial respiration, through the bodily movements required, might have proved disastrous to the patient, owing to his weakened condition from loss of blood. The contrast between the two in operation is very noticeable. In artificial respiration the patient is tugged, squeezed, and rolled about, according to the method employed; while in forced respiration he is entirely passive, and will lie for hours without moving or appearing uncomfortable as long as the latter procedure is properly kept up. In the case just referred to, the life of the patient depended upon forced respiration for nearly a day and a quarter, and now the patient is as well as ever. The question may yet arise, in desperate cases, as to the propriety of the early substitution of forced respiration for artificial respiration. When I had made my third operation, and saved three human lives after all usual methods had failed, a gentleman, who presumably was a physician, stated, in an article furnished to the "Daily Press," that "The resuscitating bellows is as well known to every physiologist as is the use of the stomach pump, and that Dr. Fell learned its use with the other students at a medical college in Buffalo, where its employment was thoroughly taught by Professor M—— for twenty years." If this correspondent had left out the word "resuscitating" he would have been more truthful, and if he will recall the apparatus used, and the manner of using it,—which will be explained farther on,—he will see his mistake. Many times during my assistantship of two years in the physiological laboratory of the college in ques-

[1] Dr. Carlton R. Jewett, of Buffalo, N. Y.

tion, when operating upon canines for the purpose of exhibiting the thoracic viscera in action, the animal has been overdosed with the anaesthetic, and respiration would cease. Under these conditions artificial respiration was always resorted to, and kept up by pressure at intervals upon the chest, after which the operation of opening the thorax would be continued, and usually among the last procedures would be the substitution of the forced respiration by opening the trachea and using the bellows. It was not "taught" that even the life of a dog could be saved by forced respiration. Of the almost thousands of graduates of this venerable school, not one excepting myself ever made the attempt to save human life by forced respiration after tracheotomy, and I would most positively aver that this application was not learned in a medical school.

By reference to "Agnew's Surgery" (vol. 3, p. 88) regarding apnoea, mouth-inflation is mentioned, and "may be used with catheter in trachea; the air is loaded with carbonic acid gas." It is farther stated that "ordinary house bellows are mentioned as adapted to artificial respiration, the nozzle of the bellows being forced into one nostril and the larynx pressed back against the oesophagus." The suggestion of such impracticable methods may have had much to do with the odium in which forcible measures in respiration have been held by physicians; certain it is that failure would result if such methods were entirely relied upon for any length of time.

Regarding tracheotomy, we find it suggested before the application of artificial respiration if apnoea (asphyxia) is produced by swallowing escharotic fluids, but no forcible measures are here suggested in connection with tracheotomy. The idea undoubtedly intended to be conveyed of the value of tracheotomy is, that it will permit the air to reach the lungs, or allow artificial respiration to be made available.

The application of forced respiration by the use of mouth-pieces or nose-pieces, permitting the air to pass through the larynx, has been long recommended. The apparatus of Dr.

B. W. Richardson, described in the "Medical Times and Gazette," December 4, 1869, is one of the forms intended to be used for this purpose.

The only reference to the operation as practised in my cases I find in Ashurst ("Principles and Practice in Surgery," p. 370; ed. 1885). In discussing artificial respiration, it is stated "that inflation with the bellows, provided with a suitable mouth-piece or nose-piece, may be efficiently used, provided that care be taken to secure expiration by manual compression, and that the instrument be worked gently and not more than ten or twelve times in a minute." In discussing apnoea after tracheotomy, it is stated that "Dr. Beverly Robinson, of New York, has devised an ingenious 'insufflator,' by means of which the surgeon can directly inflate the patient's chest through the tracheal tube. This instrument, or a double acting bellows as recommended by Dr. B. W. Richardson, should be employed in case suffocation is threatened. If neither of these be at hand, an ordinary ball syringe (reversed) may be used, as suggested by Dr. Green, of Brooklyn." These suggestions were only made three years ago, and I have yet to know that any results of importance have followed them, or that the idea of keeping up the respiratory acts for hours was contemplated. In none of the latest text-books which I have perused has the operation been recognised and recommended, or have the wonderful possibilities, as demonstrated in my own cases, been brought out.

The application of forced respiration per tracheotomy in the treatment of narcotism from opium or morphia appears to be original with myself. At least, extensive research has failed to indicate a record of any systematic efforts in this line. The circumstances which induced me to make and carry out the first operation will in part explain the reason for its occurrence.

June 23, 1886, I was called to attend Mr. Thomas J. Dyke, a night clerk in a drug store in Buffalo. He had taken an overdose of morphine the midnight previous. The symp-

tomatic effects of the poison were markedly evidenced, and with the whole armamentarium of a most complete drug store at our disposal, after using all the most approved methods of resuscitation, the patient gradually succumbed to the inevitable. At this time I felt keenly the inadequacy of the methods at our command; then and there I thought of the work in my physiological laboratory, and remarked that if the opportunity presented, I would make the experiment. Having held the chair of Physiology in the Medical Department of Niagara University since the institution of the department, I was conversant with the requirements and procedure in the performance of forced respiration on dogs. I was thus supplied with the apparatus, and being also engaged in the active practice of medicine, I at last obtained a suitable patient upon whom to operate.[1]

REPORT OF CASES.

Case I. At 12:30 a. m., Saturday, July 23, 1887, I was called to attend Mr. Patrick Burns, book-keeper, residing at No. 49 Morgan street. I found the patient in a semi-conscious condition. His wife reported that he had been drinking heavily for a week past, and had been in the habit of using alcoholic liquors to excess for ten or twelve years. His present excesses induced him to try chloral to produce sleep, but finding this unsuccessful, he added twenty grains of morphine,[2] with the following result: According to his statement, he had taken the drug late on Friday afternoon, so that sufficient time had elapsed to permit complete absorption. When first discovered by his wife, he was breathing stertorously, and was with difficuly aroused. A draught of black coffee was given, which produced vomiting. On my arrival, I supplemented this with one of mustard, sodium chloride, and water, which effectually emptied the stomach. This produced no farther effect, as the patient, left to himself, immediately passed into the deep, narcotic condition of opium poisoning. The pupils were markedly contracted, and it was evident a serious case was in hand. At this time I administered two cathartic pills which I had with me, and, at different times, minim doses

[1] I should have liked to give a description of the apparatus used or suggested by Dr. Beverly Robinson. I wrote to the gentleman, and he referred me to his work on Nasal Catarrh for a description of it. I failed to discover it after carefully perusing the work. Wrote to him again; but have as yet (October 8, 1888) received no answer.

[2] Mr. Burns stated on questioning, that he had a powder two inches long, three fourths of an inch wide, and about one fourth of an inch thick, and that he took one half of it; on measurement, found equal to grains xx.

of fluid extract of belladonna; sent for some atropia, and frequently administered the one sixtieth of a grain hypodermically. To keep the patient awake, he was dressed, and two attendants walked him around the block in the cool, pure atmosphere of the early morning. At each round I examined him, and administered more atropia. The fourth or fifth round, when within one half block of the house, his limbs gave out, and while being tugged and jerked along, stertorous breathing began again; he was carried into the house and laid on the floor, as I believed, to die. This was about 3:30 A. M. As the respirations failed, and the intervals between them lengthened, Sylvester's method of artificial respiration was employed, and kept up at intervals long after I had given up any hopes of the man's recovery and until I was thoroughly exhausted, and, farther, without apparent benefit to the patient. In the meantime, I notified the family that the patient could not live.

At this juncture, Father Grant, of the cathedral, appeared, and performed the last rites of the Catholic Church. At my suggestion, a bed was prepared in the front parlor of the house, and the patient laid upon it. From Mrs. Burns I obtained the data for the death certificate, which I confidently expected to file in the morning. I then took a last look at the patient, only to confirm my opinion that death was imminent, and then thought nothing more could be done. I was too thoroughly fatigued to think of forced respiration.

The pulse, before Father Grant came, had registered as high as 180, and before I left the house it could have been counted with difficulty: I considered it 200 or more. The respirations at 4 o'clock in the morning were five per minute, and, when I left the house for home, were intermittent, or with a long intermission followed by a few spasmodic respiratory efforts, and then apparent inanition for a time. I left for home a little after 5 o'clock in the morning, went to bed, and, after a sound sleep, was awakened by a call about 8 o'clock.

Dr. F. R. Campbell,[1] who, through illness, had been unable to respond to an early summons from Mrs. Burns, called about 8 A. M., and finding Mr. Burns still alive, sent for me. I promptly repaired to the house, and indeed the patient was alive, with respirations, however, not more than one per minute, and the pulse with difficulty to be detected at the wrist. The extremities were quite cold; the face had assumed a cyanotic appearance; pupils still contracted. The doctor suggested that more atropia be given hypodermically, to which I assented. Together we repaired to the drug store near by, had some powders prepared, and on our return were surprised to find the pupils *widely dilated;* it is needless to say no more atropia was administered. The sudden dilatation of the pupils was undoubtedly caused by the paralysis of the nerve centres controlling the iris, and is one of the frequent conditions in the last

[1] Deceased September 14, 1888.

stages of opium-poisoning, and indicative of general muscular paralysis; it is also known as the "dilatation of asphyxia."

Dr. Campbell made the remark, "We can do nothing more now." I agreed with him; but recalling the case of Mr. Dyke, and my views then entertained, I mentioned to Dr. Campbell my conviction that Mr. Burns's life might be saved by opening the trachea, placing a tube in it, and, with suitable apparatus, keeping up the respirations until the poison could be eliminated. I informed him that I had the apparatus used on dogs in the laboratory of the college at my residence near by. He offered to assist if I would make the experiment. With the aid of a gentleman stopping at the house, I obtained the apparatus. On my way I asked Dr. G. H. McMichael to assist in the operation.

Details of operation.—The tracheal tube was quickly cleaned with a bi-chloride solution, and the operation of tracheotomy begun at 9 A. M. The haemorrhage was overcome before incising the trachea. The greatest difficulty was experienced in passing a ligature[1] about the trachea to prevent the air from passing up the throat. After this was accomplished, we were ready to begin the respirations. The blood passing from the incision was of a dark coffee-color, indicating an extreme venous condition. Having been deeply occupied with the operation, I had not noticed the condition of the patient farther than to be able to state that no respiratory effort had been made for some time, and that the dark blue tinge of the face had materially increased.

We began the forced respirations; and as some interesting physiological changes ensued, it may be well to note them carefully. (See effects of forced respiration on narcotised human subjects, page 59.) The lungs were inflated; not the slightest expiratory effort was made, indicating not only paralysis of the muscles of respiration, but loss of elasticity in the lung tissue. No mention has been made of the difficulty encountered after the patient revived and began to move uneasily about; these movements loosened the tube in the trachea and started haemorrhage, and as at this time the patient was depending upon the forced respiration for his life, the result was made uncertain. This was the most serious time in the operation. In the house were boarding three soldiers of the U. S. recruiting service, who were quickly summoned, and performed efficient service in restraining the patient. At this time, and before the tracheal tube was first inserted, considerable blood passed into the lungs; it was subsequently coughed out at the opening of the valve of the apparatus. At 12 o'clock, mid-day, after the forced respirations had been under way two and one half hours, the ordinary tracheotomy tube was substituted for the tube of the apparatus, and the patient allowed to breathe for himself.

[1] This is now obviated by placing a ring on the tracheotomy tube. See description of apparatus.

To add to the uncertainties of this case, the night following the operation a bad attack of delirium tremens set in; the patient became quite violent, requiring at times four or five men to restrain him. This condition passed away, and with the exception of abnormalities in the number of respirations, nothing farther happened to complicate the case.

CASE II. The second case was cited in the "Lancet" of October 15, 1887. Dr. Länger, of the Vienna hospital, took an overdose of morphine or laudanum. An incision was made in the trachea, and the patient's life was saved by forced respiration. I have not seen the details of this case. The operation was made after the reports of my first case (read before a section of the Medical Congress at Washington) had appeared in the medical journals.

CASE III. Mr. J. A. V., aged 43, took two ounces of laudanum and some chloral about 9 or 10 P. M., Saturday, December 10, 1887. About midnight his wife heard him breathing heavily, tried unsuccessfully to arouse him, and sent for a physician. Dr. Lawrence G. Hanley, of the Emergency Hospital, was the first to respond to the call, and was shortly thereafter followed by Dr. Jacob Goldberg.[1] The condition of the patient at this time, 1:15 A. M., indicated that a large dose of some powerful narcotic had been taken. Breathing was stertorous; pulse, 128; respirations, six per minute; and pupils contracted. At 1:40 A. M., Saturday morning, I was called, and found that the physicians were employing Sylvester's method of artificial respiration. Assuming, at their request, entire charge of the case, I had the patient placed upon a mattress on the dining-room table.

2:20 A. M.—The natural respirations ceased, or would last but a short time without the aid of the artificial respirations. Pulse, 72 to 84, indicating satisfactory oxygenation of the blood; however, the notes taken at the time show that the natural respiratory efforts were so irregular and deficient that it was difficult to count them.[2]

The inefficient character of the natural respirations, even when supplemented with the artificial method of Sylvester, was evidenced by the gradually marked increase of cyanosis. Previous to this, when noticing the first good results of the artificial respiration in this case, I informed the physicians that this would be a good time to effectually answer those who believed that artificial respiration would accomplish as much as forced respiration in cases of deep narcosis from poisons which act upon the respiratory centres. I informed them that if the life of the patient could be saved by artificial respiration, or by any other known means, my apparatus should not be used. It was evident that the artificial respirations were doing little good, growing less and less efficient.

[1] Dr. Samuel Goldberg was present later in the case. Also a number of medical students.

[2] This case is reported from full notes taken during its progress by the different physicians present.

2:30 A. M.—Natural respirations, seven per minute. 2:40 A. M.—Natural respirations, stertorous, twelve per minute; pulse, 120. 2:45 A. M.—Natural respirations, fifteen per minute, but so "shallow" that little good was effected by them.

3:25 A. M.—Respirations failed. Owing to evident signs of heart-failure, it was considered by all the physicians present that the life of the patient demanded the application of forced respiration. Time was given to demonstrate beyond question the uselessness of the artificial respiration, until it was feared that the patient might succumb before the forced respirations could be applied.

3:40 A. M.—Operation of tracheotomy begun. Blood venous. Dr. Hanley remarked at the time that it was "ebony colored."

4:05 A. M.—*Forced respirations* begun. In a short time the pulse became stronger, and was reduced to 78 per minute.

5:30 A. M.—Pulse, 102. 5:45 A. M.—Pulse, 64. 6:25 A. M.—The patient, *up to this time insensible*, opened his eyes, stared in a half dazed manner, and raised his head from the pillow. He recognised Dr. Goldberg (by voice only, as afterwards stated), and, in answer to inquiries, stated that he had taken twenty grains of chloral with some stimulant. This was found to be untrue.

6:45 A. M.—First noted that when forced respiration is discontinued not the slightest attempt at breathing is made by the patient, even when the cyanotic condition is extreme.[1]

During the progress of the case water was frequently swallowed by the patient. In one or two instances the forced respirations were unintentionally kept up when the patient was swallowing. The glottis being opened at this time, water entered the lungs and was subsequently coughed up and passed out of the valve of the apparatus.[2]

7:00 A. M.—Pulse, 96.

8:15 A. M.—Pulse, 108. It was found that the patient could breathe for himself, but only for a short time, and the forced respirations had to be continually kept up.

9: A. M.—The trachea tube not being secured tightly in the trachea, permitted quite an amount of blood to pass into the lungs and the air to pass upward into the mouth, so that the lungs were not thoroughly inflated at each inspiration. This blood gurgled ominously at each respiration. With a curved needle encircling the trachea, another ligature was passed and tightened about the trachea and tube. The forced inspirations following markedly improved the action of the heart.

As the poison became more completely incorporated with the blood

[1] See effects of forced respiration on narcotised human subjects, page 59.

[2] This indicates, in part, the value of the application of the apparatus in cases of drowning; also that it would be objectionable to pass a tube into the larynx by way of the buccal cavity when the elimination of poison is important, as liquid, in swallowing, would be apt to enter the lungs.

the effect of even a short stoppage of the forced respirations was indicated in a weaker action of the heart. At one time the rubber tube connecting the respiratory or air valve with the trachea tube became almost completely clogged with clotted blood. It was removed and thoroughly cleaned, as was also the inner tube of the tracheotomy tube a number of times. Digitalis fluid extract, in half minim doses, was given a number of times; also atropia, one eighth grain at one time, and smaller doses also. No dilatation of the pupil took place at this time.

The question of keeping up the forced respiration when there seemed to be no prospect of the ultimate recovery of the patient was seriously discussed. I was urged to discontinue the respirations on account of the case's being considered hopeless. At one time I stopped the respirations for a longer period than usual, thoroughly discouraged and tired. The man was not dead, and we had to keep it up.

11:30 A. M.—Drank some brandy and water; vomited. As the patient had at this time been given up to die, his family were permitted to see him and "bid him good-bye."

12:00.—Pulse, 117. Grain $\frac{1}{75}$ of atropia administered hypodermically. 12:10 P. M.—Face cyanosed; efforts to breathe made; twitching of toes; respirations not supplying air enough. 12:40 P. M.—Owing to a solution of atropia being placed on or in the eyes, the pupils gradually dilated.[1] Pulse, 126. 12:55 P. M.—The patient, who had become unconscious for a short time, regained consciousness and drank some water. Pulse, after drinking, 168, weak and flickering. After this more air was administered by giving three movements of the bellows for the inspiration instead of two, as formerly.

The Rev. Mr. Gracey, of Grace M. E. Church, looked in upon the operation about this time, and held service in the adjoining room. Late in the afternoon my brother, Mr. Chas. F. Fell, gave valuable service in assisting in the work of forced respiration.

3:20 P. M.—Temperature 100.5° Fahr.

6:00 P. M.—Pulse, 120.

After nearly fifteen hours of continued forced respiration, at 6:15 P. M. the patient began breathing for himself. Respiration fourteen per minute. This lasted fifty-five minutes, when the respirations lowering to eight per minute, at the request of the patient the forced respirations were again proceeded with.

9:15 P. M.—Pulse, 120; respirations, fourteen, natural; becoming shallow they were supplemented with the forced respirations.

11:30 P. M.—Pulse, 100.

December 11, 1887, 12 midnight.—It is now twenty hours since the forced respirations were begun.

[1] This may not have been judicious, but was done under the belief of all the physicians present that the patient could not recover.

1 : 05 A. M.—Pulse, 128, strong. The patient has been breathing for himself for the last four hours, but has now requested that the forced respirations be used for a time. Since then he has breathed spontaneously. For over fourteen hours he could not be left to breathe voluntarily, even for a half minute, without evident discomfort and danger, viz., between 4 : 00 A. M. and 6 : 30 P. M. of 10th inst., and for nearly seven hours thereafter the natural had to be supplemented by the forced respirations.

4 : 00 A. M.—Pulse, 117. Although oleum tiglii to gtt. v. has been administered, no movement of the bowels has taken place. Essence of pepsin, beef peptonoids, milk and spiritus frumenti given a number of times. Enemata of water, soap and water, with oil and stimulants, given also.

Every six or eight hours the catheter was used. Up to 12 : 30 A. M., 11th inst., and some twenty-seven hours after two ounces of laudanum had been taken, not more than six ounces of urine had been drawn from the patient. This large amount of poison (two ounces) had been going the round of the circulation, producing its maximum effect on the whole system. The left arm was partially paralysed, the brain congested.

Between 3 : 00 and 4 : 00 A. M., 11th inst., bowels moved for the first time. At 7 : 00 A. M. the patient left the table without assistance to use stool. At 9 : A. M. the tracheotomy tube was removed, wound plugged antiseptically, and patient put to bed.

Although very seriously ill for three or four days following, no serious lung difficulty set in, and the patient has fully recovered.

CASE IV. Julius Baere, a resident of Lockport, N. Y., aged forty-five years, of a nervous temperament, a naturally lively disposition, was subject, through ill health and mental suffering, to spells of melancholy, which were aggravated by several serious reverses in business and other matters which need not be stated. He was of medium height, weighed about one hundred and thirty-five pounds, and was in poor condition to withstand the terrible physical ordeal to which he was to be subjected. January 24, 1888, he left home for Buffalo, having previously obtained a two ounce vial of laudanum. On his arrival at Buffalo he put up at the Continental hotel, complained of not feeling well, ate very little supper, and retired to his room. This was the last time he was seen until he was found next day at three o'clock P. M., to all appearances dead (so reported).

The first physician to arrive at the hotel was Dr. Luther Phillips, who, on examination, gave up the patient. The physicians from the Fitch Emergency Hospital, Dr. George E. Penrose in charge, next appeared and administered brandy and ether subcutaneously. Drs. William A. Hoddick, Carlton R. Jewett, Hermon Mickle, John D. Flagg, and several others subsequently were present during the progress of the case, and

without exception gave it up as hopeless. Coroner Kenny was summoned, and before leaving his office telephoned to Undertaker Rodney to go to the hotel with a coffin, which he did.

The two ounce vial of laudanum was found empty; the throat of the patient was cut, severing the trachea and anterior jugular vein; it was found also that the left arm had been incised with the razor so as to clearly expose, without opening, the basilic vein. At this time the patient was making a faint gasp once in about ten seconds, and breathing through the hole he had made in the trachea.

On arrival at 5 P. M., Jan. 25, I found the corridor and bed-room filled with physicians and laymen, the patient lying on the right side of the bed. Haemorrhage extensive;—as an indication, it may be mentioned that the right side of the over- and under-shirt, the shirt-sleeves to the wrists, right end of pillow, and side of mattress were literally soaked with coagulated blood. A tall slop-jar at head of bed was one half full of blood and water. The pupils contracted, pallor of face, and an occasional gasp only indicated that life existed. No pulse at wrist, and fluttering movements of heart on auscultation; skin cold; patient had a cadaverous appearance, and of course was unconscious. The physicians had ceased their efforts at resuscitation.[1]

My first marked interest was in noting that the incision in the trachea was just suited to my tracheotomy tube, which I immediately inserted, causing a reflex inspiratory spasm. Within one minute from the time I entered the room I was practising forced respiration upon the patient.

Within a few minutes the cyanotic condition slowly passed from the face. Forced respiration being kept up steadily, in about three hours, at 8 o'clock P. M., the pulse could be detected at the wrist and the patient showed signs of consciousness. The bowels moved freely, great quantities of stercoraceous matter passing from the patient. At 9 P. M. the patient became fully conscious of his surroundings and condition Contraction of the pupils continued, showing continued effect of the narcotic. When forced respiration was discontinued an occasional uttempt at respiration was made; at no time, however, during the first ten hours while the instrument was in steady use, would he make more than two or three attempts at respiration without it.

As he gradually became weaker from continued movements of the bowels and frequent attacks of vomiting, attempts were made to nourish him. The most easily assimilable substances were rejected. Milk and lime water, peptonised liquids, liquid and powdered peptonoids, iced champagne, brandy, etc., were used, but the stomach would not retain

[1] Dr. William A. Hoddick reported the condition of the patient at time of my arrival as follows: "Skin cold, cadaverous appearance, lips colorless, the pallor of death apparent, extremities cold, pulse almost imperceptible, only a slight fluttering of the heart could be discovered, eyes insensible to light, pupils completely contracted, but little blood in the body."

them; vomiting continued; the patient approached the stage of collapse; brandy hypodermically was frequently given without marked benefit. The action of the heart was of a bounding, uncertain character, undoubtedly produced by a deficiency of blood upon which to work. At one time stercoraceous vomiting set in; in fact a most deplorable condition existed. It was decided to attempt the introduction into the circulation of a saline fluid by the transfusion method. I repaired to the Fitch Accident Hospital, secured the apparatus and the assistance of Dr. Penrose, who with Dr. Mickle opened the conveniently exposed basilic vein of the left arm, introduced the transfusion cannula, and allowed about six ounces of the fluid to slowly mingle with the circulation.[1]

No apparent change was noted in the condition of the patient from this injection; the forced respiration was continually kept up, and the life of the patient depended upon it, as all other means taken would have proved futile without it. At this time no pulse at the wrist could be detected for fifteen minutes at a time; the carotid pulse could be made out at all times. Continuing the work through the night with the aid of my class of students from the college and a number of physicians, toward early morning the opinion still prevailed that the case was hopeless. The wife and daughter of Mr. Baere were called in to see him. Their presence, with that of Mrs. A., the wife of the hotel proprietor, seemed to cheer him up. Mrs. A. urged me to discontinue the work of resuscitation, on the plea, shared by all, that it was only prolonging the misery of the patient, and the case was hopeless. I urged, as in my second case, that a physician was not justified in giving up until life became extinct, and kept the forced respirations under way. The unsuccessful attempts at feeding by the stomach had been discontinued for a time after the stercoraceous vomiting. The nourishment of the patient, however, had become a matter for serious consideration, and, at the suggestion of Dr. C. R. Jewett, half teaspoonful doses of Cibil's Fluid Extract of Beef diluted with a little carbonic acid water were administered. This was the first substance to be retained; the dose was repeated, increased, and at last the patient showed signs of improvement.

Some twelve hours after we had been at work, the satisfactory result of forced respiration, as a means of breathing for a human being, was demonstrated in the passive condition of the patient. During the forenoon the effect of the narcotic gradually passed away, the pupils dilating more and more. The condition of the patient was such, however, that he could not breathe for himself for any time without evident discomfort and risk. The forced respiration had to be kept up. During the day many physicians and laymen visited the room and witnessed the steady action of the apparatus. Noon passed, and yet the patient could not be

[1] The formula for this fluid was as follows: ℞.—Sod. carb., grs. iij; Sod. chlorid., grs. xviij; Aquae ℥ vij; Misce, inject one to six ounces.

left to breathe for himself. At 1 : 30 P. M., however, nearly one full day (twenty and one half hours) after the forced respiration was begun, Mr. Baere began to breathe for himself. In a few hours he became so fatigued that he begged to have the forced respirations resumed, and the little instrument was again called into action, quieting and easing the patient. Several times was this done before he continuously breathed for himself, thus making the use of the instrument to cover more than a day before it was laid aside for good. Toward evening the temperature of the room in which the patient lay became so cold that he was transferred to a warmer and better location. Under careful treatment he rapidly improved, but complained of constant pain in his chest. It was feared that pneumonia would set in, as the respirations were somewhat rapid. It did not, and there was nothing to indicate that the lungs were unfavorably affected by the long continued forced respiration. Within five days after the operation, the patient was transferred to the Hospital of the Sisters of Charity, and his temperature was normal and pulse 96. The pain in the chest was found to have been caused by the hyperdermic injections, given at a time when the circulation was so inactive in the surface capillaries that gangrene was produced by them. The poor fellow suffered for months after the operation from this cause. The greater portion of the left breast sloughed down to the ribs, and in the right thigh an abscess, produced from the same cause, appeared, which, when first opened, on the 20th of February, gave out a pint of pus. There is, then, a possibility of overdoing the hyperdermic treatment where a large quantity of blood has been lost. I do not hesitate to state my belief that Mr. Baere would have been in condition to leave the hospital within two weeks of the date of the operation, had it not been for the result produced by hypodermic medication. At this time following it, his throat was closed up and in good condition. He was able to walk about and do light work long before he left the hospital, and when he did so was in better physical condition than he had been for years.

Regarding my first three cases, there is no question as to the outcome, had any other known means been tried to save them. Forced respiration alone is to be credited with the saving of these lives to future usefulness. To demonstrate beyond question the thoroughness of the work accomplished, at my request Messrs. Burns, Van Orden, and Baere, all in good health, appeared before the Fourth District Branch of this Association, at its meeting in Buffalo, May 8th of this year, where I gave a preliminary report upon the subject of this paper. To the insurance companies this work was a boon, as it saved to them some $23,000 life insurance.

I have in this manner endeavored to present a truthful account of my first work in this field. With all associated in the cases, I stand equally surprised at the results. I now give a series of cases in many respects not so interesting as the first three, but still presenting the influence of forced respiration in these serious cases in a most remarkable light.

Case V. This case is taken from the records of the Emergency Hospital, where it occurred, and is reported by the house physician, Dr. J. F. Mulherin:

Hospital Case No. 1,000,—Peter Church, aged 80, U. S., admitted May 18, 1888, 8:30 P. M., address 909 Seventh street. This man was brought in ambulance from 126 Mohawk street, where he was found in a dazed condition. Patient had stated to friends at this place that he had taken laudanum; empty bottle shown to ambulance attendant. On admission patient unconscious, pulse full and strong (84 per minute); respirations about ten per minute; pupils contracted down to pin points.

Emetics administered; atropia, gr. $\frac{1}{100}$, hypodermically, and catheterisation at 8:35 P. M.; repetition of atropia, gr. $\frac{1}{100}$, in ten minutes. Artificial respiration by Sylvester's method at 9 P. M.; heart failed, and respirations about three or four per minute; respirations gradually became imperceptible; atropia gr. $\frac{1}{100}$; also brandy and digitalis given hypodermically.

At 11 P. M. Dr. Fell was called, and tracheotomy with forced respiration determined upon. Present, Drs. Fell, Heath, Mickle, and Mulherin. Trachea opened and tube inserted by Dr. Heath at 10:25 P. M.; forced respiration commenced; patient seemed to revive; pulse became fuller, was irregular; color in face returned, and at 12:15 A. M. patient first opened his eyes. Stomach tube introduced to wash out contents, at 12:30. Injections of soap-suds per rectum, 1 A. M. This found inefficient, and gtt. ii olei tiglii, administered at 1:15; urine again drawn at 1:45. Signs of returning consciousness at 2:30; patient opened eyes and lifted hand. Between 2 and 3 A. M., condition good, pulse full and regular; vigorous slapping of face and yelling in ears elicited no response; 3 A. M., pulse 90; 3:45 A. M., patient suddenly raised his arms and attempted to speak. At this time the forced respiration was discontinued, but patient refused to breathe. At no time since the operation was begun has the patient been cyanotic. At 4:15, patient again threw his arms about, and in answer to a question, said he was "awake." Haemostatic forceps removed from neck after vessels were ligated; slight haemorrhage. Respiration continued; 5 A. M., patient opened eyes, became somewhat convulsed, and again relapsed into a state of unconsciousness; two ounces nitre given by the mouth, and stimulants through the air-heating section of the

apparatus. At 5:15 A. M., bellows working at the rate of 108 movements per minute, patient by this means receiving 21 respirations to the minute; pulse good and color of face normal; 5:20, air-heating apparatus again used; 5:40, heated air discontinued; at 5:50, urine drawn; 7:00 A. M., face and hands more cyanotic, pulse 90, temperature 99.5° Fahr.; 7:30, pulse growing weaker, patient somewhat cyanosed; 8:20, failing; 9:00 A. M., pulse 88, heart very weak; 9:30, pulse varies, becoming alternately strong and weak. At no time during the operation has the patient been able to breathe of his own accord. At 10:00 A. M., pulse 90, temperature 98°. Peptonised beef extract given per rectum; 12:45 P. M., patient made a few convulsive efforts to breathe, again relapsed into unconsciousness, pulse becoming very weak and feeble; patient grows pale; skin cold. Complete cessation of pulse at 1:10 P. M., May 19; patient dead; forced respiration discontinued and instrument removed at 1:13 P. M.

In this case the patient was kept alive by the forced respiration for fourteen hours and ten minutes; and it is reasonable to infer that his life was prolonged at least twelve hours longer than it could have been by any other methods known.

CASE VI. May 26, 1888, I was called to the residence of H. C. F., Delaware avenue, Buffalo, and found his eighteen-day-old infant held by a nurse in a tub of warm water; body deeply cyanosed; an occasional gasp indicated that life still existed; pupils contracted; reflexes absent. Inquiry elicited the following history: A homoeopathic practitioner of Buffalo had been called to prescribe for the child. He took out of his case a powder containing morphiae sulphat., gr. j. By some psychological freak, he directed the nurse to give it to the babe, thinking he had replaced it in his case and handed her a harmless powder in its stead. Some time after the physician had left the house, the nurse called the child's mother's attention to the superscription on the powder,—morph. sulph. gr. j,—and with the probable belief that all medicine was harmless, the fatal drug was placed in the mouth of the little one at 12.45 P. M., and all absorbed. At 2:30 P. M. the child was discovered in convulsions, a physician, Dr. A. M. Curtis, summoned, and the usual steps taken to resuscitate. When it is considered that the quantity of morphine taken was equivalent to about seventy doses for an infant of this age, it appeared a hopeless task. From 2:30 until about 4:30 P. M. artificial respiration was used with little benefit. It was nearly 5:00 P. M. before I arrived at the house, and with difficulty, only to be appreciated by experience, I made tracheotomy. Previous to the trachea being reached, respirations would cease; but by placing my mouth over the nose and mouth of the babe and forcibly blowing, the lungs were inflated, resulting in keeping up the action of the heart until the trachea could be irritated. Irritation of the trachea, followed by incision, seemed to stimulate the

respiratory centres for some time; but as the case was approaching a crisis, at last a small sized catheter, $\frac{1}{8}$ inch external diameter, was used to make connection with the trachea, and by an increasing series of larger tubes, this was connected with the tube from the air-valve of the forced respiration apparatus. About 6 P. M. the forced respiration was begun, Dr. A. M. Curtis giving valued assistance in holding the small tube in the trachea. In fifteen to twenty minutes the cyanotic condition passed away, the child steadily improved for an hour, when the cyanosis returned. Examination revealed that the tube had slipped out of the trachea. After replacing, forced respirations were continued, and natural hue of health returned. The pulse improved, ranging for a time at 134 per minute. Drs. W. H. Heath and Geo. W. Lewis were called in to assist. Natural movements of the limbs returned, reflexes again established, the limbs moved, bowels acted freely, and eight or ten natural respirations were taken. Hopes for recovery were almost entertained from the remarkable changes produced by the forced respirations, but at 9:10 P. M. pulsations indicated heart-failure, and at 9:30 P. M. the little heart ceased beating.

In this case, no less than in those preceding, the result of forced respiration was remarkable. The infant, only eighteen days old, had for five and one quarter hours been subjected to the influence of one grain of morphine, in an asphyxiated condition for at least four and one half hours, thus weakening the muscular tissue of the body. Under forced respiration life was retained with the results mentioned for three and one half hours. I hazard the opinion that if forced respiration had been instituted within the first two hours, the results might have proved different.

June 18, 1888, I was called to attempt the resuscitation of a still-born babe. No heart action could be detected. A catheter was placed in the trachea by intubation method, connected with the forced respirator; lungs were inflated and expiration produced by pressure; no results. The child was undoubtedly dead before the forced respiration was begun. The feasibility of the operation was demonstrated.

APPARATUS.

The most simple form of apparatus for forced respiration with which I am acquainted was that used in the physiological laboratory of the medical department of the University of Buffalo. It was merely a simple hand bellows, the nozzle of which was inserted into an opening in the trachea of the animal operated upon, and secured by a ligature. The inspiration was produced by giving one to three forcible movements of the bellows, and the expired air was allowed to pass out

through the relaxed bellows. The dogs being killed immediately after the operation by puncture of the medulla, any laceration of the trachea by the nozzle of the bellows became of little consequence. It is readily seen that this method would prove disastrous if applied for any time to the trachea of a human being.

Richardson's instrument to reëstablish respiration consists of a cannula or tube to connect with the mouth- or nose-piece, or with the trachea. Connected with this by two tubes are two rubber hand bulbs, somewhat similar to those on an ordinary atomiser. The compression of one bulb forces air into the lungs; the other exhausts it. An objection urged against this apparatus is, that the quantity of air entering and passing from the lungs is uncertain. To keep up continuous respiration by squeezing a bulb thirty-six times a minute, eighteen times for inspiration and the same number for expiration, is, in my opinion, so impracticable as to prevent such a method from ever coming into general use. As the most important part of the apparatus is made of rubber and is perishable, it might give out when most needed in an emergency.

Somewhat akin to the instrument just mentioned is that devised by Isaiah D. Emery, of New Haven, the object and description of which, by the inventor, is set forth below:

The aim and intent of the inventor is to produce a device that is adapted to treat weak and diseased lungs, or any disease requiring the purification of the blood by aeration, or for the resuscitation of drowned persons, or for any like or analogous purpose, and to this end it consists more particularly in providing a receptacle of compressed air and a vacuum chamber, so adapted and constructed and furnished that they can be easily managed by means of a pump, and by connecting pipes and mouth-pieces the user may be able, with one tube, to inflate and expand the lungs with compressed air, and with the other tube to contract them through the agency of the vacuum-chamber; and also in combining with my device, and in connection with the compressed air-chamber, a vessel or chamber filled with any medicated compound or medicine, liquid or gaseous, or any liquid; and also in a spray device that may, if desired, be used in combination with the mouth-pieces and pipe or tube from the compressed air-chamber.

An apparatus of this description would prove expensive, cumbersome, and open to the objection which may reasonably be urged against instruments which exhaust air from the lungs.

In my description of apparatus I exclude catheters, tubes, etc., which have frequently been used by intubation of the trachea in spasmodic attempts to keep up respiration, and which have been of little value so far as systematic effort is concerned.

In my laboratory in the medical department of Niagara University, I have always used foot bellows attached by rubber tubing to the air valve. This air valve was arranged with a stop-cock or valve which had to be turned both for the inspiration and for the expiration. The valve and tracheotomy tube were in one piece, making it cumbersome, weighty, and presenting the great objection that each time the valve was turned the trachea was given a wrench. With this apparatus I made my first operation upon Mr. Burns: forced respiration was kept up two and one half hours, and the life of the patient saved. The results of this operation pointed out the defects in the apparatus, and on careful consideration I concluded that the following requirements should be obtained in an instrument adapted to forced respiration upon man:

1. It should be portable, not easily got out of order, so as to be always ready in an emergency.

2. It should be arranged to work equally well with a tracheotomy tube or a tracheal tube, as in intubation.

3. It should permit the patient to move about without interfering with the steady, continuous action of the apparatus.

4. The inspiration should be entirely under the control of the surgeon, irrespective of the method by which the air is supplied, whether by bellows, air-reservoir, or air-blower.

5. A continuous is better than an intermittent supply of air.

6. It should enable the respirations to be kept up for twenty-four hours.

7. A ready and effectual means of heating and medicating the air should be provided in order that the operation may be carried on in the open air or in a cold room.

8. It should not interfere with or prevent the natural respirations at any time during the operation.

9. A ready means of connection or disconnection with the tracheal tube should be provided.

10. It should be capable of use on young or old.

One or the other of all these requirements has been indicated by the practical difficulties met with in the cases upon which I have operated. How well they have been met in the simple and inexpensive apparatus which I now present to you, may be best judged from the recital of the cases which have been reported to you.

I am well aware that the description of this apparatus would offer little interest to the medical world had not the results obtained by it exceeded those heretofore contemplated by similar methods. This apparatus consists of a tracheal or tracheotomy tube, an air-valve, air-heating apparatus, and air-supply device or bellows. These several parts are connected in the order named by flexible rubber tubing. A detailed description of the different parts of the apparatus is given below:

Tracheotomy tube: An ordinary tracheotomy tube may be adapted to the purpose. To the tracheal end of the tube is screwed a ring, which, in outer diameter, corresponds to the inner diameter of the trachea; a series of rings of different sizes may be provided. In the operation of tracheotomy a longitudinal slit equal in length to the inner diameter of the trachea is made, the tracheotomy tube with ring inserted and pushed along, thus occluding the trachea so that the air forced into the lungs will not regurgitate into the larynx or oesophagus. Fitting loosely into the outer end of the inner tracheotomy tube, so as to be easily removed, is another small tube connected with the air valve by flexible rubber tubing. This simple arrangement permits connection to be made with the tracheal tube at will, and the flexible tube

allows the patient to move about without interfering with the forced respiration.

Air valve: This controls the passage of air into the lungs, and is the most important feature of the apparatus. The air in passing through this valve may take the following directions: Under a continuous stream of air from bellows or other device it passes through the air-valve into the outer air, thus preventing over-distentions of the bellows; at the same time the outer air may pass through the valve into the lungs and the expired air from the lungs, as in expiration. Now comes the forced respiration, which is produced by simply pressing on the piston of the valve, forcing it down and opening a passage from the bellows to the lungs, which will remain open until the pressure is removed from the piston, after which the air courses through the valve, as previously stated. The surgeon who manipulates this valve is therefore responsible for any over-distention of the air vesicles, and is guided as to the time of inspiration and expiration by the movements of the bellows. These are made conveniently small, so that two or three movements are required for the inspiration, and the same number for the expiration. The same valve and bellows will suffice for the respirations of a child or adult, only a little quicker action of the bellows in the case of the child being needed. To clearly illustrate the truthfulness of this somewhat paradoxical statement, I have prepared two pairs of artificial lungs, one representing those of the adult, the other of a child about six or eight months old. These artificial lungs are made as follows: An inch thick board, 6½ by 12½ inches square, midway of its length and about one inch from one edge has two three-quarter inch holes, bored partly through and placed about one half inch apart. Into the edge of the board is made a three-eighths inch hole which connects with the two previously mentioned, and a tube put in the latter to which the tube from the air-valve may be attached. A piece of thin rubber elastic cloth ("rubber dam") is then placed on the side of the board upon which are the two holes, and cemented all around the edges and across the board

between the two large holes. By forcing air through the tube in the edge of the board the rubber is inflated in the two divisions representing the lungs. The inspiration is produced by the bellows, and the expiration by the elasticity of the rubber, which acts as soon as the pressure of air is discontinued, representing the elasticity of the lung tissue. We thus have the rubber alternately expanding and contracting, simulating very beautifully natural respiration. The artificial infant's lungs are prepared in the same way, but the board is much smaller in size, only 3½ by 5¾ inches square. If the large sized tracheotomy tube be used with the larger (adult's) lungs, two or three movements of the bellows will nicely inflate the rubber dam, and the same movements for expiration allow the air to pass out before the inspiration is again underway. If the large tube were used with the small lungs, one movement of the bellows would most likely burst the rubber, but with the tube used in the trachea of an eighteen-day-old infant, a very small size (⅛ inch outer diameter), three movements of the bellows only sufficed to partly inflate the small lungs, while with a trifle larger tube, the same movements thoroughly filled them. These demonstrations indicate that the size of the trachea has very much to do with controlling the quantity of air passing into the lungs in inspiration. The demonstration could be readily made upon large and small dogs; but as the rubber lungs are always ready, I prefer them for this purpose, and to illustrate the working of the apparatus.

Air-Warming Apparatus: This is connected with the air-valve by another flexible tube, and consists of a copper vessel containing a small quantity of water which is heated by an alcohol lamp. The vessel is so arranged that the air supplied by the bellows is made to pass through the heated water, thus warming it to a suitable degree. By a series of diaphragms in the vessel any excess of moisture taken up by the air in its passage through the water is removed. By medicating the water in this vessel, medicated air can be supplied, or even an anaesthetic, to the patient. With this

arrangement, which I here present, I can force air heated from 90° to 100° Fahr. into the lungs, and keep it up for hours, when the external atmosphere is near zero.

Air-Forcing Apparatus: May be ordinary house bellows, a blower run by crank or electro-motor power, or any method by which air may be steadily supplied. The bellows used in my operations were hand or foot blowers of the ordinary laboratory form, supplied with a rubber equaliser, by which a steady pressure of air was kept up.

The whole apparatus, therefore, consists of the bellows, a connecting tube, the air-heating device, a second connecting tube, the air-supply valve, and a third connecting tube before the tracheal tube is reached, and from which the third tube is readily detached.

It will be seen that this apparatus provides for all the requirements previously enumerated, and has been used with remarkable results from an infant eighteen days old to a man of eighty. That it might be improved in detail may be admitted: an automatic valve or pump which would limit the period of inspiration, and a self-propelling bellows, might be devised, but for ordinary emergency cases it is all that is needed. In many cases the air-heating apparatus may be dispensed with. The whole apparatus may be carried in a small hand satchel.

EFFECTS OF FORCED RESPIRATION UPON NARCOTISED HUMAN SUBJECTS.

Observations obtained from various sources, and from the practice of forced respiration upon animals, have given us a comparatively full knowledge of the physiology of respiration. The result of the same operation in the cases reported will, I think, add much interest to the subject, emphasise some points, and confirm others obtained by observation on the lower animals. I present the conditions observed, beginning with my first case, Mr. Burns. It will be remembered he had taken morphiae sulph., grs. xx. When forced respiration was first applied the patient was cyanotic (see report of case, page 41). The effect of the respirations was ob-

served much sooner on the heart than on the lungs. Change from venous to arterial state of the blood was first noticed; the pulse at the wrist became stronger and quite regular some time before attempts at respiration were made by the patient. Forced respiration was under way some twenty minutes before any attempts at breathing were made by the patient. A long interval elapsed before additional attempts were made. The ruddy hue of health returned to the face, and the first attempts at natural respiration were indicated by two or three quick, hurried movements of the lungs. These subsided, and without both forced inspiration and expiration the patient would have quickly succumbed.

Sensibility was returning, as indicated by reflexes of the ocular muscles. The next feature was a movement of the limbs followed by one of the arms. Shortly after, the eyes opened, staring wildly. Consciousness returned, the patient eagerly drinking water proffered to him. After about two hours' work the natural respirations became longer and longer, until they appeared almost normal.

The opening in the side of the valve (one eighth by one half inch) which permitted air to pass in for the natural respirations, was not large enough to supply the lungs with their full requirement, so that natural breathing could only be carried on for a short time before dyspnoea would ensue. This was evidenced on the part of the patient by gasps and uneasy movements. When these occurred the natural were supplemented by the forced respirations with the effect of always quieting and easing the patient.

When the forced respirations were kept up for a short time, and the blood became surcharged with oxygen, it would be some time before attempts to breathe would be made. This was frequently observed; advantage was taken of it, and this condition produced when the change from the cumbersome tracheal tube of the respiratory apparatus was made to an ordinary tracheotomy tube, and the patient allowed to breathe for himself.

Observations on the respirations.—In the variation in the

number of respirations we find one of the most interesting and instructive features of the whole case. When the operation was begun, at nine o'clock on Saturday morning, the rate was less than one per minute; when completed, three hours later, some eighteen or twenty per minute, and remaining at the normal number during the rest of the day. During the following night they were again modified by the delirium, and the next day, or about twenty-four hours after the operation, had lowered to the unpleasant rate of only six per minute. Here they remained for a short time, then gradually came up to eight, ten, twelve, and fifteen, and two days after the operation became normal in number and action. This remarkable variation can most easily be explained by assuming that the shock and paralysis of the system had been almost completely overcome by the forced respiration; that the residual poison in the blood did not exert its influence under the forced respirations, but that in the following twenty-four hours, under the ordinary conditions of the system, the poison remaining again produced its effects; and had not the eliminative organs steadily continued to rid the system of the narcotic, secondary poisoning might have taken place, with serious if not fatal results, or forced respiration might again have been resorted to. In all these cases it is interesting to note the marked difference in favor of forced respiration over artificial respiration in effects produced on the respiratory centres. Where the latter will not suffice, the former should always be substituted before a fatal prognosis is rendered.

In Case 3 (Mr. J. A. V.) paralysis of the respiratory centres was more complete than in the first case. Two ounces of laudanum were fully absorbed. The patient had been kept alive three hours by artificial respiration, and the forced respiration was carried on for two and one half hours before consciousness fully returned. Fifteen minutes after this it was noted that the patient would not make the slightest attempt to breathe when the forced respiration was discontinued. This was not apnoea (taking that meaning of the

term in which the respirations are discontinued by the surcharging of the blood with oxygen), but under the ordinary continuous operation of the apparatus. During the first six or eight hours of this case the bellows were given two movements for inspiration, not furnishing sufficient air to supply the system with its full requirement of oxygen. The consequence was, that cyanosis gradually increased until the face, lips, eyelids, pinnae of ears, and dorsum of neck gave marked evidence of it. In this condition, when it would seem that the tissues of the body would be demanding oxygen, not an effort would be made toward natural respiration when forced respiration was discontinued.

The most remarkable feature in this interesting case was, that under this condition of marked paralysis of the respiratory centres and deep cyanosis, the patient was conscious, and would respond to ordinary requests, such as drinking when desired to, and, when asked to "take a long breath," would evince the power of the will over the respiratory muscles or centres by responding with a good effort at inspiration. He would, however, immediately subside into his former lethargic state, and make not more than the one voluntary effort at respiration. Cyanosis would increase, and when the condition of asphyxia had been reached, the extraordinary respiratory efforts were noted, but immediately subsided when the forced respiration was again instituted. Many persons beside the four physicians who were present observed this condition, as the experiment was repeated a number of times in their presence. These facts, and those noted in connection with Case 4, give reason to believe that forced respiration may have a wider field than merely in cases of opium poisoning, and illustrate in a most interesting manner the marked difference of function between the anterior and posterior portions of the brain, the cerebrum and medulla oblongata.

In Case 4 the respiratory centres were not so completely paralysed as in Case 3. Owing to the great loss of blood, the effects of the opium had almost passed away some twelve or

fifteen hours after the forced respiration was instituted, but the vital energy remaining was not sufficient to enable the patient to breathe for himself until some twelve hours later. This is thoroughly attested. In this state the patient was "as quiet as a lamb" for long periods at a time under the forced respiration, and after it had been discontinued requested the reapplication of it. It supplied a need in this case that artificial respiration with its bodily movements could not have done.

In the case of the old gentleman eighty years of age, who was reported to have taken tr. opii. ℥ i, the entire cerebral system seemed thoroughly paralysed. The return of consciousness compared with the other cases was slow, and lasted but a short time. Here old age had an influence, and the tissues of the brain had undoubtedly lost their susceptibility to stimulation. In the case of the little eighteen-day-old infant, the changes wrought by forced respiration were beyond expectation. That a child in the state in which this was found could be made again to respond to the influence of any agent so as to affect the entire system, after having been under the narcotic effect of so large an amount of morphia, seems almost incredible. I cannot ignore the grand results obtained by artificial respiration in many cases of opium poisoning, and could cite many remarkable cases, but feel, from the short although important experience with forced respiration, that we have in it something more than a dernier ressort compared with artificial respiration; and all that is needed to demonstrate such to be the truth is its application to suitable cases when presented. One fact which should be borne in mind is, that artificial respiration in extreme cases is always carried on at the expense of the patient's energy,—and we might emphasise the fact that the physician expends about all he has also,—whereas in forced respiration, with an attendant to work the bellows, the patient is passive and the physician has merely to press on a valve some eighteen times a minute. In a long continued fight for life, this is a factor of no inconsiderable importance.

Forced respiration in drowning.—It goes without saying, that forced respiration may come into application in all cases where artificial respiration may fail to keep up the action of the heart. In cases of drowning we shall find a favorable field for its use. All of the cases previously cited prove conclusively that the cephalic centres respond more readily to forced respiration than to artificial respiration. If I chose to make comparisons, I could show that the early return of consciousness in deeply narcotised subjects was greatly in favor of forced respiration. On this account, and from the results I have already obtained, we must expect that in almost all cases of asphyxia, from whatever cause, forced respiration will be considered the most reliable agent that we can apply.

Where tracheotomy is necessary, owing to the objection of the great majority of the medical fraternity to cutting operations, it may not be generally used. In drowning and many other cases tracheotomy need not be performed; forced respiration may be applied by intubation of larynx or trachea. I can best illustrate the method of applying it in drowning by presenting an imaginary case. A patient removed from the water lies still before us; a slight fluttering of the heart indicates life; water may still remain in the lungs. With suitable forceps pull out the tongue; pass the flexible rubber tracheal tube by aid of the tracheal guide, a curved steel bar which hooks up the epiglottis and carries the tube back and presents it at the laryngeal opening, and by which it is easily passed a short distance into the trachea; withdraw the tracheal guide, secure the tracheal tube with tape about the neck, connect the forced respiration apparatus, and you are ready to breathe for your patient. Now force a minimum amount of air into the lungs: if water be present, a gurgling sound will disclose it.[1] To remove it, invert the patient, raise the hips and lower the head, and if water be present the air will rise above it and force it out of the air valve. After this, replace in dorsal position, apply heated and medicated

[1] In case No. 3 the gurgling of blood in the lungs could be heard ten feet from the patient.

air, water per enema, hypodermic stimulation, etc., but nothing by the mouth, for fear it might pass into the lungs. We have in drowning no poison to eliminate, therefore no special need of eliminative medication by stomach, as in opium poisoning. As soon as the patient may be depended upon to breathe for himself, remove the tracheal tube and give liquid food by the mouth.

Forced respiration in shock.—In shock we have the combined afferent nervous impressions proceeding from the injured terminals, producing a greater or a less degree of paralysis of the central nervous system through or by which the various important functions of the economy are carried on. We do not have the respiratory centres almost alone paralysed, as in opium poisoning, but we may include all the functional centres of the economy. Did we not have frequent evidence of recovery from shock, I would not suggest the possibility of keeping up or saving human life in such cases by forced respiration. I offer the cases of Mr. Baere and Mr. Van Orden as instances from which it is reasonable to infer that forced respiration may give us results in shock to be attained by no other means, or may serve as an accessory to other methods of overcoming this bane of surgical progress.

DISCUSSION ON NOSOGRAPHY.

REMARKS INTRODUCTORY TO A DISCUSSION ON NOSOGRAPHY.

By Alfred Ludlow Carroll, M.D., of Richmond County.

October 9, 1888.

My first duty is to make a preliminary report from the committee appointed at our fourth annual meeting to consider the views then presented by Dr. Gouley on the subject of nosography.

To elicit in briefest form the general sentiments of the committee, the following queries were put to vote:

1. Is there need of a classification of diseases?
2. Should such classification be based on anatomy?
3. Should the nomenclature convey accurately the true nature of morbid conditions?
4. Should the method of classifiation conform as far as possible with that adopted in botany and other branches of natural science?
5. Is it desirable to establish an international system of classification and nomenclature?

The answers received were unanimously in the affirmative, with but one qualification, relating to the practicability, in the present state of our knowledge, of classifying upon an anatomical basis the exanthemata and parasitic diseases, or of satisfactorily conveying the true nature of morbid conditions by a nomenclature in strict accordance with anatomy.

Other mental reservations and explanatory modifications of the monosyllabic reply will probably be set forth in the papers which we are about to hear.

In debating a theme so intricate and difficult that the most enlightened industry of many successive generations has failed to satisfy even contemporary demands, it should be borne in mind that, from a purely critical point of view, classification and nomenclature are, to a certain extent, separable. The latter is, of course, necessary for the recording and interpretation of the former, and should convey with etymological correctness the ideas which it is intended to express; but, this condition being reasonably fulfilled, attention should not be distracted from the spirit by too myopic pedantic peckings at the letter. For the very sake of intelligibility, it may sometimes be expedient to depart from rigid pedagogic precept. For example, the Greek prefixes, "hyper" and "hypo," are unfortunately so nearly similar that the retention of the final "o" in the latter before a compounding vowel, though contrary to strict scholarly rule, may be defensible in the interest of the student of medicine, who, without a preliminary classical education, might easily confound opposite meanings.

That there is need of a proper classification of diseases must be evident, not alone to those who are engaged in exploring the labyrinth of mortuary statistics, but to every teacher and practitioner of medicine. Under the present method—or, rather, lack of method—lesions and symptoms, causes and consequences, are so interchangeably confused that our literature is robbed of the greater part of its value, and the progress of scientific education sadly retarded.

Until our knowledge of pathology shall be complete, an ever diminishing portion of any system of classification must of necessity be provisional, and there will remain an excuse for the symptomatic naming of unknown pathic conditions, such as "myxoedema," "progressive muscular atrophy," "glycosuria," and others, as there was in the past for "falling sickness," "white swelling," "fungus haematodes," "lochial or puerperal fever," etc. But, just as in the botanist's collection, as soon as the real characters of such doubtful specimens are ascertained, they should be withdrawn

from their temporary pigeon-holes, labelled with fitting specific and generic titles, and ranged in their appropriate order.

In nosography, hitherto, it has been forgotten that classification should be founded on differences rather than on similarities, proceeding from the individual to the variety, species, genus, order, and so on successively, as these differences become wider and characteristic of larger groups. The separation of the largest groups in accordance with their agreements is a later affair. This plan is followed in all other departments of natural science, and notably in botany and zoölogy (of which latter our study of man is but a highly specialised branch), and not the least of its advantages is, that any changes rendered necessary by advancing knowledge affect only the terminal members of subordinate groups. Evidently, also, as regards nosography, instead of antagonizing science and practice in medicine, the very groundwork of a scheme so arranged lies in accurate clinical observation of sub-varieties and varieties, and each specialist contributes what is of essential importance to the whole, as the ichthyologist, ornithologist, or entomologist furnishes the basic data of zoölogical tabulation. A correct system of classification, therefore, will not only be an invaluable aid to the practitioner of medicine, but must primarily depend on his trained power of differentiation.

Touching the proposed principle of classification, it must be remembered that the word anatomy is employed in the work under discussion in its most modern and widest sense, as comprising the actions as well as the gross and microscopic structure and chemical constitution of the various component parts of the body, in both normal and abnormal conditions; and, in this sense, it is impossible to think of any alteration or derangement which could not find suitable place, or of any clinical phenomenon which could not be satisfactorily registered, if it were satisfactorily investigated. It fully covers what Hughlings Jackson has called the three-fold clinical problem of a disease,—"anatomical, seat of lesion; physiological, functional nature of lesion; pathological, dis-

order of the nutritive process,"[1]—and gives provisional room for what we must be content to term "functional" disorders until we shall have discovered the structural alterations which undoubtedly induce them. A sorry sort of empiricism would result from the general adoption of Moxon's dictum, that the physician "must know diseases, not as the zoölogist knows his species and his genera and his orders, by descriptions of comparative characters, but as the hunter knows his lions and tigers,"[2] and he who "goes a gunning" therapeutically with such superficial lore will be apt to waste snipe-shot on a rhinoceros or explosive bullets on a reed-bird. This lion-and-tiger kind of notation almost inevitably degenerates into mere symptomatology, and is responsible for the insoluble ambiguity of many of the death certificates which used to bewilder me while I was engaged in superintending their registration, and for the shallow diagnoses which too often discredit the profession and injure the patient. It has led to regarding a prominent effect or congeries of effects as a morbid entity, and afforded ground for the irrational dogma of Hahnemann, that "the totality of the symptoms constitutes the disease." It is a surprisingly common thing to find deaths ascribed to "paralysis," "dropsy," "coma," etc., and to hear of "general debility," "biliousness," and "complication of diseases," which are really coördinate results of a single cause. A patient whom I was asked to examine some months ago, suffering from mitral regurgitation and cardiac dilatation, has since then passed into the care of another diagnostician, who has shamed me by the brilliant discovery that she has both "asthma and dropsy," and similar instances are doubtless within the almost daily experience of many here present.

If it be admitted, as it is by most modern thinkers, that pathological phenomena are but perversions of physiological actions, "governed by the same fundamental laws which direct the normal processes of life" (Michael Foster,) then

[1] "On Diseases of the Brain," Brit. Med. Jour., July 14 and 21, 1888.

Q uoted by Jackson, loc. citat.

it is manifest that pathology is potentially classifiable by the same method as physiology, namely, on an anatomical basis; but it is equally manifest that our knowledge of both of these branches of biology must be perfect before our classification can be permanently established. The existence of symptomatic titles is a virtual confession of ignorance of the pathic conditions which they conceal, as is most remarkably exemplified in the terra incognita of mental diseases, where contending classifications are founded principally on single symptoms. "General paresis," "reasoning mania," "erotomania," "kleptomania," "folie circulaire," "agoraphobia," "aboulomania," etc., mean as little as possible, therein conforming with the amount of our information as to their pathogeny; such terms as "folie a deux" mean absolutely nothing; and "melancholia" means a superfluity of black bile, in survival of the ancient hypothesis of its aetiology. "Cholera" is the direct opposite of a flow of bile, and "struma" means building up, instead of breaking down.

Having gained, by observation and comparison, a sufficient knowledge of things to begin to classify them, the next step —since our knowledge can neither be recorded nor imparted to others save by words—is to name them; and it is a truism to assert that the name should convey our notion of the thing, epitomising, so to speak, its description. Farthermore, for the intercommunication of ideas between different nations, it is necessary that names be derived from universally intelligible roots; hence, Greek and Latin, the languages of scholarship throughout the world, must, for our purposes, supplant vernacular tongues.

When an artificially assumed meaning of a current word has been clearly defined and generally accepted, its retention in any branch of science is permissible if it be not grossly incorrect etymologically, as in the case of "geometry," which has long ceased to signify merely measurement of the earth; "electricity," which nowadays has little connection with amber; or "politics," whose ravages extend far beyond the philological bounds of a city. The very terms which desig-

nate the fundamental parts of our professional education are of this kind. Anatomy means a cutting asunder, and is etymologically as applicable to the trenchant disseverance of inorganic matter as to the structure of the animal organism. Physiology covers the entire range of natural phenomena, from astronomy to conchology, and, even in an arbitrarily restricted sense, was formerly construed as synonymous with physics. Chemistry refers strictly to liquid juices. Surgery is an abbreviation of "cheirurgia," and as pertinent to the manual labor of the blacksmith or hod-carrier as to the work of Astley Cooper, or Dupuytren, or Valentine Mott. To cavil at such time-sanctioned technics would be rank hypercriticism.

Many of the names used in pathology, however, are misnomers so monstrous, that, while possibly pardonable in the past as cloaks for ignorance, later research demands their retirement; others never had a valid apology for their existence. "Rhachitis," manifested in the long bones and internal organs, means inflammation of the vertebral column; "gout" means a drop, and is only suggestive of the occurrence of the malady in persons who are in the habit of "taking a drop too much;" "rheumatism" implies a watery discharge; "croupous" signifies "crying out," and "catarrhal," "pouring down," rendering their adjective connection with pneumonia ridiculously inapt; and, to cap the climax of absurdity, we frequently read of "hysteria in the male" and "gonorrhoea in the female." Baseless imaginings of remote similitudes to lower animals or to plants have encumbered us with a farrago of nonsensical appellations, such as "ranula," a little frog; "lupus," a wolf; "cancer," a crab; "scrofula," pertaining to a sow; "sycosis," fig-like; "molluscum," primarily from "mollis," soft, and mediately from a so-miscalled excrescence on the maple; "framboesia," from the raspberry; "urticaria," from the nettle; and, with consistent inconsistency, sundry sorts of tumors, either sessile or with a solitary pedicle, are congregated under the title "polypus," connotating a many-footed thing.

Then, to make confusion worse confounded in the overtaxed memory of the novice, and to discomfort oftentimes the older practitioner, we have a multitude of personal names irrelevantly attached to diseases, or even to single symptoms of disease. "Paralysis agitans" is indefinite enough, but to dub it "Parkinson's disease" is adding insult to injury. "Bell's palsy," "Duchenne's paralysis," "Landry's paralysis," are unmeaning sacrifices of pathology at the shrines of uncanonised saints, who surely would, if they could, spurn the offerings. "Dupuytren's contracture" crippled many a hand before his day; and it requires some mnemonic effort to recollect that "Dupuytren's fracture" is only an exaggeration of "Pott's fracture;" that this fracture is a totally different thing from "Pott's disease;" and that neither Pott nor Colles had any passive or active proprietary interest in the solutions of continuity which bear their respective names. How many of us are likely long to remember that "Weil's disease" is a simulacrum of "abortive typhoid fever;" that "Friedreich's disease" is a phase of locomotor ataxia, without ocular or neuralgic accompaniments; or that "Kaposi's disease" is an alias for what Hebra christened "xeroderma"? It is easier to fancy than to depict the state of mind of a student when he hears of a patient with a Naegele pelvis, Cheyne-Stokes respiration, or an Argyll-Robertson pupil, or is asked whether, in a case of suspected Menière's disease, he would try Valsalva's or Politzer's method.

With such a preposterous and perplexing jargon as has been partly sketched,—with Germans writing of "Basedow's disease," and Britons of "Graves's disease;" "carbuncle," a little Latin coal, and "anthrax," a great Greek one, both applied to a local inflammation of the corium, and the latter name, or its French translation, "charbon," assigned with equal inaccuracy to the "splenic fever" of cattle (wherewith the spleen has no causative connection), and to its inoculated effects in man; "struma," indicating in one place an enlargement of the thyreoid body; in another, lymphadenitis; in a third, tuberculosis; and in a fourth, no one knows what;

numerous mobid malefactors roaming about Europe, each with as many pseudonyms as a veteran fugitive from justice,—it is quite time to ask if an endeavor should not be made to revise our incongruities and to secure international concurrence in giving to every known thing a name which shall everywhere intelligibly express the same notion. The task is a cumulative one, involving long labor, close study, and keen debate in many lands; but the sooner it is begun the nearer will be its accomplishment; for while it embodies present knowledge, it must facilitate farther learning.

Of the precise position to be assigned to microbia in relation to disease, it is not possible at present to speak with certainty; but there is a growing opinion, supported by observation and experiment, that their intrinsic potency of evil has been overrated. The majority of the numerous varieties which have been carefully studied apparently exert a beneficent power in destroying refuse organic matter, and if an universal "germicide" could be effectually employed the human race would probably be exterminated by its own waste-products.

A few infective diseases are unquestionably associated with the presence of peculiar micro-organisms; others, from the simple analogy of their infectiveness, are presumed to have similar relations, but in these, hitherto, microscopists have either found no "microbes" at all, or else too many, and have quarrelled as to which among several cocci and bacilli should bear the special pathogenic blame. Microphytes, indistinguishable from each other morphologically, have been discerned in both health and disease, until at last the microscope has been almost set aside, and, as in the examples of the "comma-shaped" spirilla and sundry micrococci, specific definitions are predicated on assumed physiological actions alone, in as direct violation of every principle of classification as it would be to erect flatulent dyspeptics and diabetic patients into separate species of the genus homo; although cautious bacteriologists have admitted "that changes in the nutrient medium may have some effect on the form and size of the (protophytic) cells, on their mode of multiplication,

and on their physiological or fermentive properties," and that, to induce disease, the viciously disposed intruder "must find within the body, and in proper combination, all the conditions necessary for its growth and multiplication" (Ziegler), thus tacitly imputing some morbific influence preceding bacterial invasion. All individuals are not equally susceptible to infection, as they should be if certain specific micro-organisms were the verae causae of disease and capable of disorganising previously healthy tissues;—the field mouse and the domestic mouse reciprocally resist each other's so-called septicaemic schizophytes; one animal falls easy prey to an inoculation which another of the same genus absorbs with impunity; while, on the other hand, the same micro-organism is credited with producing different morbid effects in animals of different genera. In laboratory experiments it has been shown that the same ferment may evolve different products, or various ferments the same product, according to their environment; and from a clinical point of view it has seemed to many acute observers that several contagia may arise from the exaggeration of common putrefactive processes—a belief fortified to some extent by the "intensification" or "attenuation" of microbial virus through successive cultures in varying media.

Long before the transcendental evolution of modern bacteriology, the seeming analogy between the phenomena of fermentation and the manifestations of infectious disorders led to the grouping of these under the title of "zymotic diseases," and early in the career of the "germ theory" the minute organisms discovered were called "microzymes"—little ferments — the aptest of their ordinal appellations. Subsequent experience and the most recent research tend to bear out this analogy, and to suggest that the action of the bacteridiae is catalytic, and that the chemical product of fermentation—the real materies morbi—depends as much, or even more, upon the character of the fermenting medium.

One of the first observations in this direction was that septicaemia could be excited by a virus which, though proba-

bly the product of a bacterially originated fermentation, was itself demonstrably inanimate. Later, it was noticed in several instances that after certain "cultured" (or fermented) media had been freed from all micro-organisms, a something remained which was sufficient to communicate infection. Finally, chemistry is coming rapidly to our enlightenment with its already brilliant investigations into the genesis and composition of the various ptomaines, leucomaines, and still unbaptized "extractives."

In their clinical relations, it is worthy of passing note that, while the production or the ptomaines is presumably due to catalytic bacterial intervention, it is held by some of the best authorities that leucomaines may be generated by the degraded action of the tissue-cells themselves; and the question may arise, whether the somatic development of some of these leucomaines cannot, perhaps, prepare the soil for microzymotic implantation, thus constituting the individual susceptibility to exogenous infection. Again: The fact that different ptomaines, some poisonous, others innocuous, are formed successively in different stages of the same fermentation, may possibly hereafter be connected with the self-limitation of many zymotic maladies. Of the ptomaines heretofore catalogued, thirteen are stated to be more or less toxic, five to be innocent, and of the remaining nine the action is not yet known. It is not inconceivable that some of these may counteract others, and if future study shall lend weight to the conjecture, it will aid in solving the obscurest problems of pathology. Among the leucomaines, there is even now alleged evidence that a few, at least, are mutually antagonistic. Of the nature and mode of operation of the virulent "extractives" we have little beyond surmises, but a wide field is opened for farther exploration. I shall leave to the distinguished chemists who have kindly consented to join our discussion a definite survey of the boundaries of exact information concerning these and the preceding groups of alkaloids; and to my medical colleagues a more elaborate elucidation of the questions which I have cursorily introduced.

QUESTION I.

WHAT GENERAL PRINCIPLES SHOULD GOVERN CLASSIFICATION AND NOMENCLATURE, IRRESPECTIVE OF THEIR PARTICULARISATION IN MEDICINE?

Discussed by

N. L. Britton, Ph. D., of New York County.
Simeon Tucker Clark, M. D., of Niagara County.

DR. N. L. BRITTON.

In accepting the cordial invitation of your committee to address this distinguished assemblage on the topic of Biological Nomenclature, I find myself somewhat uncertain as to which phases of it I should especially devote my attention. The subject is a broad one, and in the application of its details there are still slight differences of opinion and practice among systematists in the several sub-kingdoms of Botany and Zoölogy. Absence from the state has prevented advising with the chairman of your committee, which would doubtless have rendered this paper more satisfactory to both you and me. And thus I come before you with the apprehension that my remarks will not—as your medicines unerringly do—go to the right spot. A somewhat careful perusal of Dr. Gouley's "Nosography of the Diseases of Man," and former conversations with that able investigator, have afforded me indications of what might be of interest to you in the discussion now in hand, and on these premises I have put together the following paper.

And while I would not in the slightest degree disparage the other great sub-division of Biology, I must yet express my satisfaction with the conception of the natural fitness of things which led you to invite a botanist to treat this subject. For, in the early days, all botanists were students of medicine, and to a very considerable extent the reverse also

was true. Very different is it now, when our doctors find a "drug store" on every other street corner, where they readily obtain, in concentrated form, the principles which their predecessors in the art of healing drew directly from the plants themselves, which they were necessarily obliged to know. While the literature of the science of medicine gives little prominence to this, the binomial system of biological nomenclature, accepted and established by Carolus Linnaeus, hands down to the remotest posterity the names of men of medical skill and reputation. *Asclepias*, *Aristotelia*, *Caesalpinia*, *Sauvagesia*, *Mitchellia*, *Hosackia*, are names of genera of plants, and these names will doubtless live as long as this earth is inhabited by civilised communities.

The first thought that comes to me, in considering a possible grouping of diseases similar to one applied to plants and animals, is, that from the nature of the two there may be difficulty in applying the same laws. The classification of structures,—be these unorganised or organised; be they mineral, vegetable, or animal; bodies which are tangible and visible,—may prove a very different task from that of diseases. It seems to me that Dr. Gouley's admirable and painstaking monograph indicates that there is a difficulty here, but I am also persuaded that it may, in part at least, be overcome.

The generally accepted schedule of scientific nomenclature is:

Universe	Material.	Material.	Material.
World	Inorganic.	Organic.	Organic.
Kingdom	Mineral.	Vegetable.	Animal.
Sub-kingdom . . .	———	Anthophyta.	Vertebrata.
Class	Metallaceae.	Angiospermae.	Aves.
Sub-class	———	Dicotyledonae.	———
Order	Metallata.	Scrophularineae.	Longipennes.
Family	———	———	Laridae.
Sub-order—Tribe .	Metallometallineae.	Digitaleae.	———
Genus	Pyrites.	Veronica, L.	Rissa, Stephens.
Sub-genus	———	Beccabunga.	———
Species	P. cubicus, Hunt.	V. Anagallis, L.	R. tridactyla (L) Bon. Kittiwake.
Sub-species—Race .	———	———	———
Variety	———	V. Anagallis L. var. latifolia, Britton.	R. tridactyla. var. pollicaris, Ridgw.
Sub-variety . . .	———	———	———
Form	———	———	———
Individual	1 Crystal Iron Pyrites.	1 Water Speedwell.	1 Kittiwake Gull.

On these divisions and their relative rank in the system, naturalists are practically agreed, though some of the minor ones are employed in one study and not in another,—*race*, for example, being little used in botany. The schedule is by no means as well worked out in Mineralogy as it is in the two other sciences, although some recent attempts have been made to bring that also into harmony by Dr. T. Sterry Hunt, of Montreal.

Referring to Good's Classification of Diseases as reproduced by Dr. Gouley, I find that we can parallel our other schedule without confusion in the cases I followed out. Here is one:

Universe,	Material.
World,	Organic.
Kingdom,	Disease.
Sub-kingdom,	Human.
Class,	Coeliaca.
Sub-class,	———
Order,	Enterica.
Sub-order,	———
Genus,	Dipsosis.
Sub-genus,	———
Species,	D. avens, Good.
Sub-species,	———
Variety,	———
Sub-variety,	———
Form,	———
Individual,	A single case.

It will readily be understood that there is no necessity for having all the terms of the progression filled for any one organism or case. These are supplied for use only if needed.

But we now encounter a difficulty. Dr. Gouley finds it necessary to change the rank of some of these terms. In his definitions he uses the group name *Family* (employed in Natural History synonymously with Order, or as a division of the latter) for Class; for our Sub-class he substitutes *Branch;* and for our Sub-order he has *Order*, the lower members of the series remaining the same, though in addition he inserts *Symptoms* and *Signs*, expressions for which we have no exact equivalents in Biology. Now, Dr. Gouley's schedule has been worked out with the very greatest care and thought, and I feel great hesitancy in criticising any feature of it, but if we all thought alike there would be little advance possible,

and so if it should be decided that a Classification of Diseases is a desirable thing, and it should be constructed on the basis of relative value of terms assigned by Dr. Gouley, I am sure that all naturalists would regret it, if medical men did not. And I would inquire, Cannot these terms be adjusted? It will be seen that slight changes only are needed.

Let us now briefly consider what might form the basis of a Classification of Diseases similar to, or parallel with, that successfully employed in Natural History. In Botany and Zoölogy it has long been the practice to regard Carolus Linnaeus (Carl von Linné) as the founder of the binomial system of nomenclature, and to go no farther back for names of plants than his *Species Plantarum* of 1753, and for those of animals only to his *Systema Naturae*, ed. x, of 1758. This is certainly an arbitrary restriction, and prevents the use of many good binomials applied to organisms long before Linnaeus was born. Far from originating the system, he simply saw that it was very good, and adopted it from the writings of his learned predecessors. It originated from the habit of describing plants as concisely as possible, and in many cases merely amounted to an abbreviation of the descriptive phrase.

Thus, the *Hyacinthus orientalis albus* of Gerard became *H. albus*, L., these early applied binomials being generally planned to be descriptive of some attribute of the organism, though somewhat loosely applied even by Linnaeus himself. The practice of honoring discoverers of new forms, or men eminent in science, by Latinising their names and using these as generic, specific, or varietal designations, as well as the use of geographical adjectives, has come to be so widely employed, despite the protest of more than one committee, that names have now come to have but little significance in themselves. Many, indeed, are quite meaningless as applied, while others are positively misleading, and give no more idea of the plant or animal with which they are associated than would a man's name indicate the color of his hair. In determining the proper name, the general rule is a strict application of the law of priority of publication of the specific por-

tion of the name, unless this is barred out for good reason, and if a species was originally described in a genus other than the one to which it is now regarded as belonging, the name of the original author is indicated in parenthesis. Thus, Linnaeus called Horseradish *Cochlearia Armoracia*; Fries first considered that the plant belonged more properly in the watercress genus *Nasturtium.* We write, therefore, *Nasturtium Armoracia* (L.), Fries. Varieties are similarly treated.

This practice, and the rigid application of the law of priority even to the verge of apparent absurdity, have been shown to be essential to stability in biological nomenclature. It is to be especially noted that this applies only to genera, species, and varieties. No rules have been applied to the naming of groups of higher rank, although it is not unlikely that we may be compelled to come to some agreement regarding these as well.

Now, Gentlemen of the Faculty of Medicine, if you decide to parallel this nomenclatorial system of biologists, you will doubtless encounter similar difficulties in rendering your nosology fixed and stable. You will probably find it necessary to enforce the law of priority of publication in some degree—to just what extent it is impossible to say until it is tried. If the binomial plan is adopted, you will find it convenient to cite the original describer after the name of the disease. We find this absolutely necessary in Botany and Zoölogy, for we frequently find that different authors have described different organisms under the same name. The first great question you will have to decide will be, How far back in literature shall we go for names? Shall we go to Sauvage's Nosology of 1760, and thus practically to the basal dates of Zoölogical and Botanical Nomenclature?

Surely, this is an attractive idea, but I do not know enough of Sauvage's monumental work to form an opinion as to its advisability. Leaving out of consideration the names used by him for his primary groups, can his genera and species of disease be recognised from his descriptions? In Botany and

Zoölogy we have types preserved for reference in case questions arise regarding what was meant by an author, and these types are regarded as the most precious of all biological material, and guarded with the most jealous care, whether they represent good species or not. You cannot have the same safeguard. Are a large number of Sauvage's names still applied to diseases, or have they been supplanted by others for the most part, and would their use revolutionise medical taxonomy? If Sauvage is to be rejected, is Good's arrangement any less objectionable? Or is any other existing system more available? Or, finally, will you entirely reject all that has been done, and start on a new basis altogether? These and similar questions will, I am sure, come before your committee. They should be carefully considered in all their aspects, for on the conclusions reached great issues will depend.

DR. SIMEON TUCKER CLARK.

The ancient lexicographer who said, "A thing well named is half defined," might have gone still farther and asserted that an object properly named is *well* defined. Language is not only the avenue to learning, but is the chief organ of all forms of education; and there are those who declare that it is impossible even to think without the aid of words.

Coleridge says, "A language is often wiser, not only than the vulgar who use it, but than the most learned; and this is especially true of naming, which is surely a divine gift. Being like amber in its efficacy to circulate the electric spirit of truth, the naming faculty is also like amber in its power to embalm and preserve the relics of ancient history, science, and religion; although we are not seldom puzzled to decipher that which is so preserved. Sometimes names lock up truths which were once well known, but which, in the course of ages, have passed out of sight and are forgotten. In other cases, they hold the germs of truths, of which, though they

were never plainly discerned, the genius of their framers caught a glimpse, in a happy moment of divination."

All this is emphatically true of scientific nomenclature, for it has ever been considered the bounden duty of every working naturalist to infuse into new names a wealth of correct description; to draw from the present and past nomenclatures the rich stores of thought which are latent in their names, as well as to purge their language from the corruptions and inaccuracies which time and faulty scholarship, or the absence of learning, have left upon them. It is a fact worthy of mention that many of the most noted discoveries in the natural sciences have been made by those who either from lack of opportunity, or from disinclination to pursue linguistic studies, have been, unfortunately, unfit correctly to assign proper appellations to classes, families, and genera, which they were fully competent to distinguish and describe. Hence the necessity for the modern student of natural science—it matters not in what department of the great work he is engaged—to strive to impart clearness and precision to whatever he finds that is dark, irregular, or faulty.

The formation and introduction of new words into any vocabulary is not unattended with danger. All innovations are opposed by a class of conservatives. By far the larger part of new terms introduced either die of disuse, or are slain by the shafts of ridicule. Many a term which might have stood as a monument to honorable scholarship has fallen before the winds of popular prejudice like a gold-red leaf before the November blast.

Ben Johnson said, "A man coins not a new word without some peril and less fruit; for, if it happens to be received, the praise is but moderate if not entirely wanting; and if refused, the scorn is assured."

Since scientific nomenclature is, and must ever be, scientific truth fossilised or embalmed, it follows that he who attempts innovations or changes in names will find it much more difficult to be heard than he who introduces a new name or term. This truth I once found to my sorrow. I

had ever the most profound respect for the name and work of Linnaeus; but, while pursuing the study of conchology, it seemed to me that even the great Swede had committed an error. This led me to write what I was pleased to call "A Note on Linnaean Nomenclature." In it was praised the almost superhuman skill which this great naturalist had shown in naming the mollusca: so faithfully was his work done that even the tyro, having the Linnaean-named *cypraeidae* on the one hand, and their Latin names on the other, would, in almost every instance, place the labels correctly; but it was argued, in the case of *cypraea tigris*, that the great master had given us a misnomer. Linnaeus must have mentally confounded the leopard with the tiger when he named this beautiful spotted shell after a striped animal. Therefore, as the specific name "*leopardis*" was not in use, I proposed this change. The "note" was sent first to one and then to another conchological journal, and after that to the Natural History magazines of more general character, but it was always returned as unprofitable and untimely. This was twenty years ago, and "the leopard has not changed his spots," nor has *cypraea tigris* its name. Johnson's "assured scorn" was the fruit.

The science of Botany, whether the artificial classification of Linnaeus or the natural one of Jussieu be studied, has been preëminently distinguished among the natural sciences, because its nomenclature is founded on the anatomical construction of the plant. It cannot be denied that the ultimate object of every living thing is its reproduction, and hence the sexual apparatus the highest point of development, so that the sexual, or Linnaean, classification of plants has found wide and emphatic endorsement, as has that of Jussieu, in which no part of the anatomy of the plant is disregarded.

The question which was propounded at the beginning of this paper, and which has been already so fully answered by our philosophic Dr. Britton, brings us to precisely the point where the American Association for the Advancement of Science was at what is known among its members as the

second Buffalo meeting in 1876. At that time this question was fully discussed, and the discussion led to the appointment of Dr. William H. Dall as a committee of one to confer with all working naturalists, and report at the next meeting. Dr. Dall sent a circular to all such naturalists as had published reports of original or personal investigation at any time during the preceding five years. This circular contained twenty-seven questions, and was faithfully answered by forty-five correspondents.

The report made at the Nashville meeting in 1877 showed that great unanimity existed among workers in Natural History in respect to the following particulars:

First of all, in Nomenclature, whether the zoölogist study beast, bird, fish, reptile, mollusc, or insect, he shall establish *no new names* that are not descriptive of the objects named.

Secondly. The balance of opinion is generally adverse to any attempt to limit, by arbitrary rules, the right of publication in the most convenient direction; and against any statute of limitations in regard to scientific names, other than that they shall be significant and properly Latinised.

Dr. Dall says,—" A serious mistake has been made at the outset by divorcing Zoölogical from Botanical nomenclature, as was done by a like committee of the British Association. The signal success which has attended botanists in their attempt to unify their nomenclature, when compared with the confusion reigning in other departments of Natural History, is sufficient proof of this."

The present tendency is toward a symmetrical combination of principles, which are almost identical in all the branches of natural science, but we must not expect to see the grand fulfilment in our own day. It will require the painstaking labor of half a century, and perfection complete in respect to uniformity will not then be fully attained. For example, the present generation of conchologists, who, like Lamarck, Sowerby, Lea, Jewett, and a host of others, studied only the house in which the shell-fish resided, must give way to another class of naturalists. Our shells are all named, and

their names have been verified, perhaps, by Philip Carpenter or Agassiz;—shall we forget our conchology and become malacologists? No! we are too much preoccupied, and must leave the true study of molluscan life to the young men, who will develop what has been so well begun by Dall, Morse, and Tryon,—the anatomical study and nomenclature of the living mollusca.

The third great truth, which seemed to be endorsed by all, was that no branch of natural science can be thoroughly learned, remembered, or successfully taught without a regular system of nomenclature, which shall be recognised as standard, and employed by naturalists *in all nations.* The rules of nomenclature must be impartial, and founded on principles sufficiently clear and of so much importance as to promote their ready comprehension and general acceptance.

Fourthly. Scientific names are to be either from the Latin language, or if from the Greek or vernacular, they must conform with the Latin tongue in form and termination. In Latinising Greek words, there are certain rules of orthography which should never be departed from. Compounds of Greek and Latin are inadmissible, or of any two languages. A name compounded of the first half of one word and the last half of another is a philological monstrosity.

Fifthly. Whenever a mythological allusion can be made to do double duty by acting as a mnemonic, aiding the student to retain the classical story and at the same time serve to describe the object named, it is both scientific and elegant to choose such a name. Thus when the name "Progne" is given the swallow, "Clotho" the spider, and "Nestor" the grey-headed parrot, and many other such examples, they serve to unite classical learning with natural science, and both are more easily retained in the memory.

Sixthly. Avoid names difficult of pronunciation and of undesirable length. Indicate the etymology of all names proposed, and if at any time an author has proposed a genus which has not been admitted into general use, he is carefully to avoid creating another under the same name. Much

confusion of old resulted from this, even among skilful namers, owing to the tardy dissemination of information; but in these days of rapid communication, but little such danger need be apprehended.

The application of a scientific nomenclature,—simple, significant, descriptive, and, above all things, *universal*,—is a desideratum greatly to be sought after, and can only be attained by the consent and zealous and united action of the great mass of real workers in the several branches of science the world over. Mutual concessions must be made on all sides; established prejudices and national feelings, as well as individual preferences, must be dissipated; and the greatest good to the greatest number of diligent students, as well as the technical perfection of all the sciences, the sublime end to be accomplished.

QUESTION II.

WHAT ARE THE ADVANTAGES OF A NOSOGRAPHICAL SYSTEM BASED UPON ANATOMY?

Discussed by Edward G. Janeway, M. D., of New York County.

When I came to put before myself this question, Is it possible to found a classification upon anatomy as the sole basis? I was met by the objection that it was impossible; that to-day we cannot, with our present knowledge, adopt a classification founded upon anatomy alone. Now, let us see where the trouble arises. In the first place, if we take the group of general diseases, such as typhus fever and typhoid fever, can we found a classification upon anatomy that shall take these in? A classification that will comprise these diseases can only be founded upon an aetiological factor. Are we prepared, even yet, to found our classification upon such aetiological factor? Let us take relapsing fever, in which there has been found a spirillum. Are we prepared to take that spirillum and call the disease spirillum fever? Immediately the name is changed: spirochaeta is the more correct name. We should then immediately change the title to spirochaetic fever. Would that convey to the mind of any student of medicine as full information as relapsing fever? To my own judgment, the term relapsing fever is more admissible, more satisfactory, and conveys more information than this term derived from a causative influence. Suppose we take the spirillum as a basis of classification. In this term what does the anatomy mean? If we take trichinosis, we find with the microscope trichinae. Is the trichina the anatomical part of the disease? It is not part of our system. If we found the classification upon the parasite, do we found it upon anatomy, or upon aetiology? We give it

the name trichinosis because we find the causative influence there, not because we have found the anatomical condition. The anatomical condition is the myositis; back of that is the parasite. We call it from aetiology, not from anatomy.

Let us take up the classification of some more local process. What are we struck by immediately? Take, for instance, diseases of the nervous system; try to group them under anatomy. In local diseases I believe it is the sound principle; but we meet with certain states which we call epilepsy. We cannot frame a classification that will be satisfactory unless we include epilepsy; but we cannot base our classification there upon the anatomical factor: we are not yet far enough advanced for that. If we go farther, and meet with the names of diseases to which Dr. Carroll has alluded, such, for instance, as Graves's Disease, or Basedow's Disease, does the anatomy in that case offer a satisfactory basis for classification? To my mind, the term Basedow or Graves conveys the most satisfactory conclusion. We have no anatomy that we know of which explains this disease satisfactorily: we cannot to-day place the name which defines it so as to embody the idea that is conveyed by Graves's Disease. The same applies to Addison's Disease. Here we have the change in the supra-renal capsules; but we have more than that. Would not that grouping known under the name Addison's Disease convey to our minds the most satisfactory information by which we might keep ourselves in recollection of the conditions present? It seems to me that to-day the term Addison's Disease is better than the terms that could grow out of the supra-renal capsules and the nervous system.

I think we shall have to hold that anatomy is deficient as yet in this thorough information. So we can go on with different diseases; but I think we can say this,—that as far as we have been able, and are able, to separate anatomical diseases, and to have full knowledge of the cause and the effects produced, we shall be willing, and are willing, to adopt an anatomical basis. We can do this better for local than for general processes.

These facts, which came to my mind in thinking over this subject, made me think that no classification can be satisfactory, except such as takes in, first, anatomy, and, as far as it is practicable, uses this as a basis; second, aetiology, in certain instances; and, third, common usage of certain names that have come into play because they are most satisfactory for our present purpose. But I do believe it would be well if we could have an international agreement to use certain terms, and those only. Take, for instance, the term typhus fever. In Germany the term typhus is applied to typhoid. If the Germans would consent to use typhus as we use it, and typhoid as we use it, there would be an end to that trouble.

It seems to me that we are not permitted to-day to base a classification upon anatomy. I am sorry that I am not able to speak upon the subject favoring the basis upon anatomy, but that is the way in which the difficulty has presented itself to my mind.

QUESTION III.

DOES A NOSOGRAPHY BASED UPON ANATOMY AFFORD SATISFACTORY MEANS FOR THE REGISTRATION OF CLINICAL PHENOMENA?

Discussed by E. D. Ferguson, M. D., of Rensselaer County.

This discussion has a special reference to the signification of words, and may be considered to have for one of its main objects the restriction of that halo of uncertainty of meaning which surrounds so many of our medical "signs of thought."

This removal of ambiguity of meaning has, no doubt, a great scientific value, but if it be possible of accomplishment, it will render us wonderfully if not painfully exact, and take away the main occasion for the "scientific use of the imagination;" and then, as remarked by Froueli's owl, "What would become of all our delightful reasonings . . . if we were so unhappy as to know?"

I feel my own incapacity for a tilt in this tournament, for the uncertainty of our facts has made me always rather charitable toward a certain looseness in systems of classification. This may have been due to a feeling that the accuracy of our language was fully abreast of the scientific accuracy of the "facts" in our department of general learning, and that as our knowledge became more accurate and specific, so would our terminology keep pace. In this, however, I may have been in error, for I stand a self-confessed rebel against what may be considered as an effort to "speak correctly or die." It may be that great advances in science depend upon the language we shall employ in our voyages of scientific discovery, but I doubt that such will prove true. Words to men of equal or equivalent culture will have an equivalency of sig-

nification sufficient at least for the reasonable demands of accuracy, when these words have been in common and general use for a long time, but the mental picture excited by any word will vary with the attainments of the auditor, and the associations which previous use has given.

A word *may* occasionally "speak volumes," but when it is forced to do a large service of this kind it must make active demands on the imagination.

Leaving the somewhat irrelevant criticisms of this kind, it must be apparent to all that while great discoveries in science have rarely if ever depended on the verbiage hitherto belonging to the special department of knowledge to which the discovery belonged, still the teaching and application of any branch of learning have been the most intelligent and fruitful when carried on by the aid of an exact and carefully restricted vocabulary of technical terms. Feeling the truth of this statement, and for the present putting aside my partiality for verbal license, I will try to consider the question on its real merits, for such I am persuaded it possesses.

On re-reading the question, I am the more readily reconciled to the task, for I find that it does not aim at exactness in results, only that they shall be *satisfactory*; and to be satisfactory in any system of classification, would, in the present state of science, allow of a degree of indefiniteness in the use of many terms sufficient to satisfy any vagabond in the world of words. To be satisfied, simply implies a conclusion that a good—possibly the best—result has been attained: it does not imply perfection. This fact should be kept fully in mind, for when a new scheme is proposed, the criticisms often simply imply that it is not perfect. Perfection we cannot have (even in the words we use, unless a new language shall reveal it), but, if we are reasonable, we may have that which is satisfactory.

The registration of clinical phenomena is the recording of certain facts or conditions observed by the physician, or reported to him. It is the statement as to wherein the patient varies from health, and is distinct from an effort to describe

an individual disease, though it may form the basis for the designation of the patient's condition according to some scheme of nosography.

These "clinical phenomena" relate not only to alterations of structure, macroscopic or microscopic, but also to changes in function where change of structure cannot be shown, and where it sometimes cannot fairly be assumed.

If the excretion of two instead of three pints of urine in twenty-four hours may be regarded as an anatomical fact, then there are certain elements in the registration of clinical phenomena having an anatomical relationship which have not hitherto been so considered. But, to take another illustration, I will venture the suggestion that the delusion of the pauper lunatic who believes himself to be the possessor of immense wealth is as truly a clinical phenomenon as the intermitting jet of blood from a severed radial artery; and yet this delusion has no present relationship to any anatomical scheme for the classification of diseases.

The clinical observation of morbid conditions brings prominently to view the fact that disease is a *process*, and not a fixed condition. For the purposes of investigation, teaching, study, professional discussions, explanations to the laity, and even, to a certain extent, in the practice of medicine, it becomes necessary that names should exist, and that they should convey in a more or less definite and complete manner an idea of a certain assemblage and succession of processes commonly encountered in a fairly definite order of association.

This constitutes nosography; but no nosography can be devised that would by a single word express all the variations in sequence, quantity, and quality of the phenomena belonging to any one disease, or give absolute surety that a constant and complete conception will be afforded of essential facts. Such a system would be very desirable, for it would serve to materially abridge our treatises on practical medicine, and very largely simplify the work of our students. But that cannot be the legitimate object of any system of classification of diseases. The names of diseases are only

guide-boards showing the direction in which we must carry our observations to learn and understand concerning the disorders of the animal organism. The names are not even to be considered as mile-posts or boundary limits, settling with hard and fast lines the extent or dimensions of things which by nature are not containable in close "metes and bounds." A certain degree of imperfection must exist in the results of all efforts to characterize by single words, or even by phrases, those things that are complex in their nature. That which we may hope to achieve is the selection of terms that do not in themselves tend to give erroneous ideas of the things named, and for this purpose alone there is doubtless a reasonable field for plastic surgery in our medical nomenclature.

Of all the definitions of disease that have fallen under my observation, that of Chomel is to me the most satisfactory. He says, "Disease is a notable disorder occurring either in the material arrangement of the constituent parts of the living body, or in the exercise of its functions." Here are indicated two varieties of pathological conditions—anatomical and functional.

There can be no question that in many instances of disease—probably a large majority—a careful investigation of the results of the morbid processes will show anatomical changes in a degree sufficient to render these changes a reasonable basis for description or classifying purposes. The fact that anatomy is an incomplete science, and that therefore the interpretation, and by consequence the names likely to be associated with morbid anatomy, would be the subject of change, is not a valid objection to the use of the terms belonging to pathological anatomy in any scheme of nosography, for with a change in knowledge can come a change in names.

On the unsettled question of "functional diseases" it will hardly cut the Gordian knot to class them as *disorders*, even as disorders resulting from disease, or to put them in a class as something distinct from disease. Disease itself is a disorder, and the fact that many functional diseases have been

transferred to the organic side of the dividing line through increase in knowledge, may serve to remind us of the intimate relation that exists between the two classes, organic and functional; and if our scheme fails to completely and satisfactorily include all the elements, let us frankly acknowledge it, and simply ask, while we are waiting for farther light, Who can furnish a better?

I am a believer in functional diseases; in disturbances that never manifest perceptible anatomical changes; in disturbances that may or may not affect structure. Structure is held to determine function, but it seems at present equally fair to believe that function affects structure.

It is certain that perverted function may affect structure; and to recognise this fact, that perverted function may result in anatomical changes, is of great importance in practical medicine; for if we can correct the *functional* disorder, we may prevent the *anatomical* disease.

The mystery that hedges in those processes known as functions will prevent the recognition of any "notable disorder," in the majority of instances, until it becomes apparent in the "anatomical arrangement of the constituent parts," and therefore, for practical purposes, we must recognise that anatomical changes become most frequently the special means for descriptive purposes; and as in any well organised republic the majority should rule, so let the majority decide the question in this instance. And therefore, as anatomy commonly furnishes the palpable evidence of disease, let it also furnish the descriptive terminology.

I come to this conclusion after some thought on the subject, and with a full consciousness that the ultimate purpose of any and all glossological studies in medicine should have in view the true object of that science—the prevention and cure of disease. This object, it has sometimes seemed to me, could be better served if an aetiological system of nosography could be adopted; but the essential factors in the production of disease are so rarely known, that only a limited use could be made of that method. It will be better to allow inflam-

mation, typhoid fever, and many other similar terms, to stand as protests against our anatomical system, than to raise a larger army of rebels to give us greater trouble, as we would surely do in adopting a system of nomenclature still more refractory in its practical application.

In contrasting the two great divisions of medicine,—*i. e.*, medicine proper and surgery,—it is manifest that in surgery the use of anatomical terms for clinical purposes will more readily and generally apply. A series of uncomfortable sensations connected with the act of urination need not have an elaborate description in the case-book, when they have led the surgeon to ascertain certain anatomical changes in the urethra which act as the disturbing factors in that act. On the other hand, it will probably be a long time before the science of medicine will allow us as readily to determine the special anatomical lesion associated with some cases of diarrhoea, or, in apoplexy, to assume that the sudden "striking down" was due to a cerebral or meningeal haemorrhage, embolism, or some other physical condition or toxic agent.

In the ordinary case-book record of the condition of our patients, we shall still be obliged to make use of words and verbal descriptions having relation largely to the domain of function—the expression of the sensations perceived only by the patient. From the collation and examination of these symptoms, we may hope, by the aid of some friendly physical signs, quite generally to arrive at a conclusion concerning the anatomical alteration associated very intimately with the essential nature of the malady, but we must still recognise that some diseases, or at least certain conditions now conveniently referred to by special names, have no known anatomical relationship, or, at least, not a sufficiently constant relationship for the purposes of a scientific classification. Who can tell us the anatomy of epilepsy? As well undertake to give the "anatomy of melancholy"!

We must accept that erroneous anatomical terms have and will come into use, and from that indisposition for change, which is so general and possibly valuable a feature in our

relation to human institutions, these errors will continue in the name when the fact has been shown to be otherwise. Harm may or may not result. It is at present of no practical injury that in myxoedema the swelling has been shown probably not to depend on an infiltration of mucus, and that, therefore, this recent effort to give an anatomical expression to an assemblage of conditions which it is desired to characterize as a distinct disease, has proved a failure. However, in recording the clinical phenomena of this disease, its present name, though based on an error, will still have a notable anatomical relationship, and so may prepare us for a designation by a correct anatomical term when that can be devised.

In measuring, weighing, feeling, hearing, or otherwise submitting the organs, parts, or functions of patients to the tests of physical examination, we must deal constantly with anatomical terms. The choked disc, the mitral systolic murmur, the hyaline cast, are terms with an anatomical relationship, and only wait a deeper knowledge of physiology and pathological anatomy to have in their several shades, varieties, and relationships a more distinct connection with morbid processes, which may in the future be expressed in terms of anatomical disease.

The compliance with certain conditions would render anatomical terms quite satisfactory in the classification of disease. There must be distinct and demonstrable changes in structure. The classification of these changes must be quite generally accepted and adopted, and there must be a reasonably constant association of antecedent and consequent phenomena.

While we are far from such a state of affairs at present, we are apparently nearer to it on the anatomical than on any other line of approach, so that whether we wish it or not, the larger portion of our work will find its expression in anatomical terms; and in a more or less close relationship to those terms we shall, consciously or unconsciously, arrange our description of clinical phenomena.

After thus stating my conviction as to the importance, for

clinical purposes, of the anatomical plan in the classification of diseases, I will ask a few moments in which to present a somewhat criticising thought on the general subject.

Leaving aside the larger divisions in classification, we will come at once to the naming of species. The name by which each species or variety shall be listed depends on whether we wish the name to be descriptive or simply distinctive. If we aim only at distinction, it matters little what terms shall be selected, so that there be a general consensus in their application. In fact, numbers could be used, and disease 55 might afflict A while B was suffering from 1001. The fact that Smith is known by that name, and not by the name Jones, does not affect the essential elements of his physical organisation or character. It is well known that many proper names were originally descriptive appellations, but in time the descriptive feature is usually lost sight of. Will not that fact apply to our scientific names, at least to a great extent, so that whatever terms we use, in time the association will not be through philological lines, but in the way of individualisation, or the simple distinction of one thing from other things.

We can construct tables of classification on various bases, and find elements of good and evil in each, and the differences between the lists may not always be important. There is a story that Duns Scotus was seated at dinner opposite to the king, when his somewhat gluttonish majesty propounded the punning conundrum, "*Quid interest inter Scotus et sotus?*" The reply of the witty theologian was, "*Mensa tantum;*" and so possibly the difference in some of our classifications may be tabular only. After all, the important feature is that we shall have a knowledge of the essential nature of each disease. Prior to that knowledge, we can devise no truly descriptive names, and after gaining that knowledge, any commonly accepted name will probably serve to bring up the proper train of ideas.

The signification of words is a conventional affair. All are agreed that the odor of the rose does not depend upon its

name. While general usage will determine the signification of words, many causes may arise to gradually change the meaning or form, and this change may go on, possibly in obedience to some natural law, certainly occasionally to the disgust of many persons who would regard the offspring as a monstrosity, and would therefore oppose it. When I see these efforts to fix a word, or stay its change, I am reminded of the variations on a single word in the Latin proverb, "*De nihilo, nihil fit; in nihilum, nil posse reverti.*"

Let me now disclaim any intention to criticise or underestimate the work of our honored associate who instructed and entertained us at the last annual meeting by his paper, out of which has grown two of the discussions to be had at this meeting. His ripe scholarship and painstaking methods are too well known and of too much value to allow on my part a diatribe against his work. His volume on "The Diseases of Man," recently issued, merits, and should receive, the careful study of each one of us. He has proposed a scheme of classification. I am unable to oppose it with a better. My object in this paper has been to illustrate what the leader of this discussion may have inadvertently placed in my question; but, whether through inadvertence or not, I find it there, and that is that we should in our classification seek the "most satisfactory method," and I will add that we need not expect it to be a perfect or even necessarily a final system.

Dr. M. Michel, of Charleston, S. C., said he was much gratified to have the opportunity and privilege of meeting this learned body, and expressing here his unpremeditated reflections upon one or two of the papers he had listened to with so much interest, especially upon the nosological classification. Though wholly unprepared to intrude his opinions upon those who had so carefully prepared an elaborate and exhaustive discussion, he agreed with those who sustained the view that any classification of disease should be based upon anatomy and function, structure and function. He thought the day would come when it would be shown that anatomy constitutes the only true, philosophical basis upon which we can recognise the troubles either of function or structure; and even when we met with variance of sentiment as to where we

should class such diseases as typhus and typhoid fever. Yet when we looked into the intrinsic character and nature of these diseases, there could be no hesitancy in describing typhoid fever as due to some pathological condition of the intestinal tract, and calling it enteric fever, as stated by some pathologists. In the case of typhus fever, we could generally recognise there the diseased or perturbed condition which struck at the cerebro-spinal column, and more particularly affected the spinal cord. To leave that department and turn to one more familiar, he would instance the diseases of the eye, in the light of our accurate knowledge of ophthalmology. We must base our knowledge of diseases of that organ upon the anatomical structures in the orbit. Taking one of the very diseases referred to, exophthalmic goitre, what better designation could we have of it than exophthalmos. When we came to the bedside of a patient, our first object was to look at him and see what was the matter. Even though the pathology of the disease were not made out positively, was not the name exophthalmos a good one?

Dr. Edward M. Moore, of Monroe county, said he thought he should have the privilege of saying something upon this subject, very much upon the principle that Sydney Smith proposed to speak about a book without reading it, because after reading it one was prejudiced. This whole topic was too difficult for him to handle.

That we should found a classification of disease upon the anatomical basis almost went without saying; the difficulty was in the application. Wherever we could find a convenient method of application, we should use it, and we did so by a sort of instinct. For example: When he was a student it was customary to speak of dropsy; dropsy was regarded as a disease in those days. They had just the year before learned of Bright's Disease, and had seen the first publication of "Hope on the Heart." It showed what immense progress had been made in one short life to remember that all the knowledge we have of the heart and kidneys had grown up in that time. Bright himself thought that in albuminuria there was always organic disease, and that teaching had been fixed in mind so long that it was difficult to get away from the idea that Bright's Disease expressed organic disease. Now we were gradually dropping the word Bright's Disease, as we found ourselves naturally dropping other names to express disease, unless we had a name that expressed all we knew. Scientific men seldom used the name Bright's Disease. It was just the same thing with Graves's Disease and Addison's Disease; when we gained a little more knowledge we should gradually drop them. Science would hasten the reform of what was a sort of temporary professional nomenclature. Who would now speak of dropsy as being a primary disease? We should no more so regard it than we should speak of profuse perspiration as being a disease; we referred it to diseases of the

heart, kidneys, etc., anatomical in every way. We had a great many things which we knew followed from a certain condition, to which we attached an anatomical name. That the only true basis of classification of diseases must be anatomical was quite plain, because there we had a perfectly sound foundation. The progress of knowledge caused a fluctuation of our ideas. There was, however, great difficulty in making the application. He hoped that Dr. Gouley would clear up certain questions, such as those relating to bacteria, ptomaines, and leucomaines. He had persecuted his chemical friends years and years ago, whenever he could meet one who he thought had sufficient knowledge to answer the question upon the subject of what were now called ptomaines, before ever he had heard the word. What was this poison?—could any of them tell anything about it? Could they refer him to anybody who could tell him why, when he made a post-mortem examination, he was in greater danger than when he operated on a living body? The answer was coming along. How should we endeavor to make an anatomical description of the conditions where the danger arose from the presence of a ptomaine? A ptomaine, as he understood it, was the result of some chemical alteration incidental to the action of bacteria upon tissues or upon fluids; and in leucomaines, a chemical action independent of that. If we could judge at all with reference to the anatomical element, it might be a leucocyte; it might be a blood corpuscle itself: that was an anatomical element, and if we could know how the disease originated there, how it affected it, and could know the subsequent changes, as in the case of the dropsy that occurred after mitral disease, then we could reduce this difficult subject to an anatomical basis. He doubted whether we had reached this point yet. As far as parasites were concerned, perhaps to speak of them directly as the cause of the disease would relieve Dr. Janeway's difficulty with reference to trichinosis. Dr. Moore believed he stood there only as the exponent of the general ignorance upon the subject, and he came forward rather with the idea of asking Dr. Gouley to enlighten them upon these difficult points.

Dr. J. W. S. Gouley, of New York county, said it was very gratifying to him that his two elders, Dr. Michel and Dr. Moore, should have so well apprehended the question of the anatomical basis. He had taken pains, as far as he was able, to define what he meant by the anatomical basis. He did not mean descriptive anatomy; he meant anatomy in its very broadest sense, comprising physiology, chemistry, embryology, and all that is essential to help the nosographer. Descriptive anatomy of itself is insufficient, therefore all the branches of anatomy should be made subservient to the purposes of a comprehensive nosography.

He offered no objection to the terms employed to designate the different microbia, or trichina spiralis, or any other parasite. The anato-

mist studies them, and must cut something for that purpose. Therefore, anatomy in its broad sense is what he meant, and he would again say he was very much gratified that these two progressive gentlemen, his seniors, should have so thoroughly apprehended his meaning. It was entirely possible to classify all the diseases to which man is subject upon this broad anatomical basis. He thought he had given a fair demonstration of this in the table which he had presented last year of the morbid states and morbific processes of the body. He thought he had successfully classified what is known as general pathology entirely on the anatomical basis. The anatomical is the only basis possible on which to study disease. He did not think this would ever be changed, but the present nomenclature and classification must often be revised and improved. In order to know things, their nature must be studied. The nomenclator must know before he can name, and knowing he is ready to classify. Nomenclature must therefore come before classification. Nothing would lead to changes for the better so much as the endeavors which he trusted would be continuously made in nomenclature and consequently in classification. It was entirely possible to name on the anatomical basis the changes that were caused by ptomaines and leucomaines. He had placed these under the head of alterations in the blood; under the name of septicaemia. The blood, originating from the elements of the mesoblast, was a part of the anatomy of man, and it was necessary to anatomise to study all the elements of the body. This was his answer to Dr. Moore's question, if he rightly understood it,—that the diseases caused by bacteria, by ptomaines and leucomaines, by parasites of any kind, or even by mineral or vegetable poisons, gaseous or liquid poisons—all these changes could be classified upon the anatomical basis.

QUESTION IV.

WHAT PLACE IN NOSOGRAPHY SHOULD BE ASSIGNED TO BACTERIA, PTOMAINES, LEUCOMAINES, AND "EXTRACTIVES," RESPECTIVELY, (a) FROM A BIO-CHEMICAL, (b) FROM A CLINICAL, POINT OF VIEW?

Discussed by

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DR. ELWYN WALLER.

It is interesting to note how the progress of our acquaintance with the phenomena of nature constantly tends to impress upon us the unity of the natural world throughout.

When chemistry first began to be studied as a science, and not as a means for practising legerdemain, it was supposed that the line between organic and inorganic chemistry was sharply drawn; that matter in which the vital principle lived and worked was entirely distinct, in respect to the forms which it assumed, from inert mineral and dead matter; that it was impossible to produce in the laboratory those compounds which were regarded as distinctively characteristic of the products of nature acting by means of vital forces. This barrier was first broken by Wöhler when he prepared urea in the laboratory; and since then synthetical chemistry has made such strides that it is reasonable to expect that in a future not very far distant any or all of the compounds produced by plants or animals may hereafter be prepared in the laboratory. The manufacture on a commercial scale of alizarin (the coloring matter of madder), that of artificial

indigo, and of numerous other substances of the kind, may be cited as examples of our progress in this direction.

Again: When the term "organic compounds" was sought to be confined to the compounds of carbon with hydrogen, oxygen, and nitrogen, investigations of a few years showed that any one or all of those elements might be replaced by some other element of kindred properties, as carbon by silicon, hydrogen by chlorine or one of the halogens, oxygen by sulphur, nitrogen by arsenic or phosphorus, and so on. Hence, nowadays the distinction between organic and inorganic chemistry is no longer recognised as a sharp one, though it is retained in the text-books for convenience.

It has also been thought that the formation of organic bases (alkaloids) was exclusively the function of plants. This has recently been negatived by the discovery of ptomaines, organic bases chiefly of animal origin. The result has been reached by experimenters working on at least two different lines. On the one hand, analytical chemists, making investigations having a chemico-legal bearing, have found that cadavers, and portions of the anatomy of animals as well as of man, in a more or less advanced stage of decomposition, contained alkaloids which simulated in many respects the vegetable alkaloids. On the other hand, the investigators of the chemistry of vital phenomena, who were striving to find out how the various compounds in the body were put together by noting the way in which they fell apart when the vital influence was removed, discovered that some products of a basic character were among the results of their decomposition.

The discovery of the ptomaines naturally stimulated investigation in this direction, and soon the result became apparent in the discovery of the leucomaines or bases produced in the animal economy during life. It seems not at all unlikely, however, that the distinction between the two classes drawn by Gautier[1] is one more of name than of fact, since certain bases, as choline, are found to exist both during life and as products of putrid decomposition.

[1] Bull. de l'Acad. de Med., Jan. 12th and 19th, 1886.

At the present time, looking back to the records of previous work on chemico-biological lines, we observe many observations pointing more or less directly to the probable existence of the substances which we now class as ptomaines. Long ago the name "cheese poison" was given to an unknown substance sometimes occurring in cheese, which produced toxic symptoms, and many investigations were made with the object of isolating and identifying this substance, whatever it might be. Toxic effects were also known to have been sometimes produced by the eating of fish or other articles of food. From time to time, also, reference has been made to the presence of bodies of this character. Allow me to quote, by way of illustration, portions of a paper read by F. Crace Calvert to the British Royal Society in 1860.[1]

I was induced to make some researches with the view of ascertaining the nature of the products given off from putrid wounds, and more especially in the hope of throwing some light on the contagion known as hospital gangrene. I fitted up some apparatus to condense the noxious products from such wounds, but the quantity obtained was so small that it was necessary for me to acquire a more general knowledge of the various substances produced during the putrefaction of animal matter before I could determine the nature of the products from sloughing wounds. I therefore began a series of experiments . . . Into each of a number of small barrels twenty pounds of meat and fish were introduced, and to prevent the clotting together of the mass, it was mixed layer by layer with pumice-stone, the top of each barrel was perforated in two places, one hole being for the purpose of admitting air, while through the other a tube was passed which reached to the bottom of the barrel. This tube was put in connection with two bottles containing chloride of platinum, and these in turn connected with an aspirator. By this arrangement air was made to circulate through the casks, so as to become charged with the products of putrefaction and to convey them to the platinum salt. A yellow amorphous precipitate soon appeared, which was collected. . . . This precipitate was found to contain C H and N, but, what is highly remarkable, sulphur and phosphorus enter into its composition. . . . I also ascertained the presence of these two substances by heating a certain quantity of the platinum salt with strong caustic lye, when a liquid volatile and inflammable alkaloid was

[1] Proc. Roy. Soc. X, 341,—"Some new volatile alkaloids given off during putrefaction."

obtained, whilst the sulphur and phosphorus remained combined with the alkali, and were easily detected. . . . I also remarked, during this investigation, that as putrefaction proceeds, different volatile bodies are given off. . . . As I foresee that these researches will occupy several years, I have deemed it my duty in the meanwhile to lay the above facts before the society.

Selmi, of Italy, and Gautier, of France, claim the chief honors of having established the existence of bases from putrefying material, the bases studied having been chiefly those of animal origin. The significance of the discovery has an important influence upon the way in which we shall be compelled to look upon biological phenomena.

A few words regarding the properties of ptomaines: Like vegetable alkaloids, they may be solid or liquid at ordinary temperatures, all of them having the basic character almost as strongly marked as the mineral alkalies; indeed, many of them, like potash or soda, will absorb carbonic acid from the air. As far as our knowledge of them now extends, we may classify them into the group of volatile bases, liquid at ordinary temperatures and containing no oxygen, and the solid oxygenated bases, usually white and crystalline when pure.

The volatile non-oxygenated bases have each their characteristic odor, which is often disagreeable, but frequently recalls the odors obtainable from certain plants. Of the oxygenated bases, the action with respect to solvents is often materially modified by the presence of comparatively small amounts of the impurities with which they are usually associated.

The ptomaines of both classes are as a rule unstable, being readily oxidisable,[1] also being destroyed by an excess of mineral acids, or of some of the reagents for alkaloids. They are precipitated by most of the ordinary reagents for vegetable alkaloids.

[1] Hence the reaction proposed by Brouardel and Boutney as distinctively characteristic of ptomaines, viz., the reduction of ferricyanide, yellow prussiate. (Acad. de Med., May 9th and June 14th, 1881.) This test has, however, been proved to be fallacious, since some vegetable alkaloids produce the same effect.

In constitution many are simple amines, others belong to the pyridic group.[1] Several have as yet not been sufficiently studied to enable us to assign to them their proper positions. In physiological effects they resemble the pyridic bases. Generally speaking these are,[2]—

1. Rapid dilatation of the pupil, which soon after contracts energetically.

2. Weakening of the excitability of nerve centres, which may progress as far as its abolition.

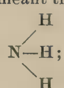
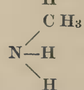
3. Loss of muscular contractility and cutaneous sensibility, preceded by a short period of tetanic convulsions.

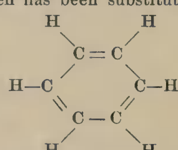
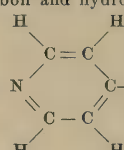
4. Slowing of the movements of the heart.

5. Somnolence and torpor, frequently followed by death.

Vaughan, in his recent work,[3] enumerates forty-two ptomaines which are recognised as distinct individuals. Of these twenty are stated to be toxic, sixteen not decidedly so, and regarding the remaining six, their physiological effects do not seem to have been determined. The non-oxygenated ptomaines are of the NH_3 type, the oxygenated ones of the ammonium hydrate (NH_4OH) type.

Many ptomaines have been detected which seem to be the active agents in certain germ diseases, the theory on the part

[1] By "simple amines" is meant the simplest form of the ammonia type. Thus, ammonia graphically represented is  one or more of the hydrogen atoms may be replaced by a group of atoms, *e. g.*,  methylamine.

In the "pyridic," nitrogen has been substituted for carbon and hydrogen in what we call the benzol ring, thus:  Benzol,  Pyridine.

One or more hydrogens in pyridine may be replaced by a group or groups of atoms, as in the simpler amines.

[2] Hugounenq. Les Alcaloides d'origine Animale. Paris. 1886.

[3] Vaughan & Novy. Ptomaines and Leucomaines. New York, 1888, p. 224.

of students of this subject being, that under the influence of disease germs, certain albuminoid principles of the body are not only destroyed, but are converted into toxic principles. If the destruction alone were the cause, they argue that the patient would show symptoms of general starvation, which is often far from being the case.[1]

As examples of such ptomaines may be mentioned tetano toxine, spasmo toxine, and also tetanine, obtained from cultures of the tetanus germ in beef broth. They produce tetanus and clonic convulsions in a healthy subject.[2] The last named was also obtained from the amputated arm of a tetanic patient.

Trimethylamine, from cultures of the comma bacillus, is another. The physiological effects are muscular tremor, convulsions, lethargy, slowing of the action of the heart and of respiration, in some cases bloody stools.[3] The existence of certain ptomaines in the bodies of patients affected with cholera, identical with those obtained by cultures, has also been shown by Villiers (Jour. de Pharm. Chim., XI, Mar., 1885), Pouchet (Comptes Rend. C. No. 6), and Nicati and Rietsch (Jour. Pharm. Chim., XII, Oct., 1885).

Typhotoxine also is supposed to be the specific toxic product of the typhoid bacillus.[4] With guinea pigs it caused salivation, dilatation of the pupil, decrease of the respiration and heart action, loss of muscular control, &c.

The name leucomaines was given by Gautier to bases formed during life, resulting from changes in the albuminoid constituents of the body, from λευκομα, white of egg. Almost all these are oxygenated, many of them are of the pyridic type, some are poisonous. They seem to be a connecting link between the positive bases and neutral bodies designated by Gautier[5] as "extractives."

The leucomaines fall naturally into two distinct groups,

[1] Vaughan, p. 91.
[2] Brieger, Ueber Ptomaine. Berlin, 1885-'86, III, 94.
[3] Brieger, loc. cit.
[4] Brieger, loc. cit., III, 86.
[5] Vide Gautier. Bull. Acad. Med., Jan., 1886, et seq.

the uric and the creatinic groups, on account of their similarity in structure to uric acid or to creatinine.[1]

The presence of leucomaines has been indicated in expired air, in saliva, in blood, in brains, in the digestive and other organs, in urine and excreta, and in pus and other secretions of the kind.

It will be seen that our present knowledge of this subject is in some respects ill defined, but that the mass of facts thus far accumulated indicate progressive changes of a determinable character in the material of the organism, whether in life or in decay.

If we take the views of Gautier and other workers in this field, their results point to the conclusion that in healthy normal life, as well as in putrefaction, the albuminoid constituents of the body are continually breaking up into substances which are poisonous to the system if not eliminated or destroyed by oxidation; that any disturbance of the system which prevents their elimination or destruction produces phenomena of disease, which result either in the retention of the toxic principle, or the production from it of substances having as great or greater disorganising action; that with germ diseases, the products of the life of the germ in themselves have a toxic action,—indeed, that this may be the essence, so to speak, of the disease; that in disinfection, the neutralisation of the products of the life of the bacillus may be of more immediate importance than the destruction of the germs themselves.

The matter has a material influence upon the view which we must in the future take of the phenomena of life, of disease, of putrefaction, or, I may add, of disinfection.

DR. NELSON B. DE S. SIZER.

Few discoveries of this wonderful century of ours have proven as theoretically interesting, or as practically important, as the remarkable facts concerning the so called "Animal Alkaloids."

[2] Creatinine, by the way, has usually been considered as a strong base. Salkowski, however (Virchow's Archiv., 102, 578), finds that when pure it is not basic.

The word "ptomaine" comes from the Greek "ptoma," a cadaver; hence these bodies are also spoken of as the "cadaveric alkaloids," or as "putrefactive alkaloids," because they are peculiar chemical compounds, usually basic in nature, which arise during the decomposition of organic matter.

From their basic properties, in which they much resemble the familiar vegetable drugs, more or less poisonous, known as "alkaloids," such as morphia, strychnia, and their like, these products of putridity are also denominated "alkaloids of putrefaction" by certain writers, this varied nomenclature at once emphasising both their chemical affinities and their mode of origin. By far the greater number now known come from animal decay alone, so that it is accurate enough still to adhere to the old names, although recent observation has shown that a few of these curious bodies have a vegetable origin also from putrefying tissues.

The number of ptomaines already recognised is great, and more are added at frequent intervals. They vary in their properties almost *ad infinitum*, some being most virulent poisons, others seeming absolutely inert. Most are feebly, if at all, toxic, and this is a most fortunate thing, as will be seen in the sequel. We shall find it well to remark, *en passant*, that not all poisonous putrefactive products are to be considered ptomaines, but those only of an alkaloidal nature. This definition, it will at once be seen, excludes such bodies as phenol, hydrogen sulphide, and the like.

As far as now known, all ptomaines contain nitrogen, and in this they are like their namesakes, the *vegetable* alkaloids. Oxygen is not always present, and those in which this element is absent are found to be analogous to the *volatile* alkaloids of vegetable origin, like nicotine and coniine, etc., the others corresponding to the fixed vegetable alkaloids.

Since the days of Pasteur we have all learned that putrefaction is due solely to the presence of active living bacteria in the decomposing body; as a necessary result, it logically follows that all our cadaveric alkaloids must also be a result

of the growth of these microscopic organisms. Experiments also tell us that the particular variety of ptomaine produced depends upon the special bacterium present, upon the material undergoing decomposition, upon the temperature, the more or less abundant supply of oxygen, the duration of the putrid process, and upon several other variable factors.

For example: As far as we now know, "Eberth's bacillus" alone can produce the alkaloid "typhotoxine," and the special bacillus of tetanus is necessary to form "tetanine," which, injected subcutaneously, causes tetanoid convulsions.

Brieger proved for us another valuable fact,—that even the "Eberth bacillus" produces no typhotoxine if cultivated in peptone, where it flourishes to perfection, but if we inoculate a test-tube of sterilised bouillon from our peptone culture, we get at once a plentiful crop of both bacillus and poisonous alkaloid.

Fitz is authority for the statement that the bacillus butyricus, which acts on carbo-hydrates to produce butyric acid, produces propylic alcohol if grown in glycerine; and under certain conditions it was noted by Morin that amylic alcohol sometimes appears as one of the products of this germ.

Another example of this curious fact is that of the mycoderma aceti, or "vinegar fungus," which converts ethylic alcohol into acetic acid, a process as familiar to all as the "making of vinegar" from cider, or other alcoholic liquids. If we let the germs act on propylic alcohol, we get propionic acid; but it seems, queerly enough, to have no effect on other alcohols, such as the amylic, the methylic, and the primary isobutylic.

We are all, I presume, familiar with Pasteur's use of the words "aërobic" and "anaërobic" as applied to bacteria, according as they thrive with or without oxygen; and we might, from what has already been said, at once infer that various ptomaines may appear during decomposition, according as the material is or is not exposed freely to the air by the depth or the shallowness of burial, or according as the soil of a cemetery is porous, being sandy, or impervious, from its

clayey nature,—this variability of ptomaine being directly due to the presence or absence of certain bacilli, according as this or that variety needs, or is independent of, a constant supply of oxygen.

We find, also, even with the same organised ferment present, that the putrefaction products vary, not only with the supply of air, but also with the stage of decay; the ptomaines are only transition products, mere "half way houses," between the organic and inorganic kingdoms, and no matter how complex the function or how differentiated the tissue, all that remains of it at last is carbonic acid gas, ammonia, and water. So, then, as the possible varieties of the carbon compounds are almost innumerable, we may easily see that there is room for all sorts of variations in toxicity of product, because the carbon atom, during decomposition, may pass immediately from being part of an excessively virulent body to another which may be an entirely inert substance.

It would be a gratuitous affront to suppose that this learned body requires to be reminded of the fact that before the time of Pasteur we were all taught that putrefaction and oxidation were synonymous terms; but we know better now.

Tyndall was, I believe, the pioneer in demonstrating the beautiful fact that nothing more than a simple plug of absorbent cotton is needed to filter out the air-borne causes of decay, although permitting the free passage of air to and fro through its meshes. It is therefore a possible thing to keep a flask of properly sterilised bouillon sweet and fresh for an indefinite period, without either corking or sealing it in any way. These facts lie at the foundation of the success of all our great canning industries.

PTOMAINES IN FOOD.

Ever since the dawn of history men have known that eaters of putrid food were often seriously sickened by their disgusting meals; and such cases multiplied as new methods of preserving food for future consumption were invented. Till the time of Von Haller no investigations worthy to be called

"scientific" were made of such cases, for he was the first to use intravenous injections of putrid matter upon animals, and to observe their effect.

About the end of the eighteenth century, Morand published an interesting account of his observations of the results of the injection of stale meats, and was succeeded by Gaspard from 1808 to 1814, who repeated the old experiments and noted certain tetanoid symptoms, from which he correctly inferred that the toxic agent was neither carbonic acid nor hydrogen sulphide. He was less happy, however, in his suggestion that ammonia might be the poisonous body.

In 1820–'22, Kerner published his famous essays on poisonous sausage, but wrongly ascribed this property to a fatty acid, similar, as he thought, to Thenard's "sebacic acid," and like it, also, arising from putrefaction. Still later he came much nearer the truth by suspecting that a volatile principle might, also, be present in combination with the fatty acid. This seems to be the first suggestion that the active agent might be of an alkaloidal nature.

About the same time, Dupré reported the appearance of a new disease, arising from use of foul water, occurring in soldiers under his care during a very hot and dry summer.

Magendie, still later, extended these observations by causing animals to inhale the vapors arising from putrefying matter, obtaining, in some individuals, distinct typhoid symptoms.

From 1820 onward, we have had many workers in the field of poisonous food. Sausage poison occupied the time of Dann, Büchner, Weiss, Schumann, Cadet de Gassicourt, and many others, including the great Orfila, but nothing new was discovered for many years until chemical methods had been vastly improved.

About 1850, Schmidt, of Dorpat, opened up a new field by studying the decomposition products found in the excreta of cholera.

Two years later, Meyer, of Berlin, took up the subject by injecting the blood and excreta of such cases into the lower animals.

In 1853, Stich found that putrid matter, given internally, produces intestinal catarrh and choleraic evacuations, with trembling, unsteady gait, and convulsions, yet none of his post-mortems revealed any important lesion. He therefore concluded that putrefying substances contain a ferment capable of rapidly decomposing the blood.

In 1856, a most valuable and important contribution came from Panum, who was the first to demonstrate the true character of the poison present in rotting flesh as a chemical substance, for he pointed out that it sustained, unharmed, treatment which is fatal to all living things. For instance: He proved that the poison in dog's flesh can be extracted therefrom by water and filtration;—it is not volatile, but fixed, for it does not pass over by distillation; it is not destroyed by boiling or complete desiccation, as it preserves all its poisonous qualities after drying at 100° for eleven hours. This "putrid poison" is insoluble in absolute alcohol, but is found in the aqueous extract of the dried putrid flesh. The intensity of Panum's "putrid poison" is comparable with that of "curare," serpent venom, and certain vegetable alkaloids, for 0.012 gramme was enough to almost kill a small dog.

Panum also showed that the toxic effects produced were quite different from those due to any of the ammonium salts, tyrosine or leucine, nor did they have any analogy with the symptoms of typhoid, cholera, pyaemia, anthrax, or "botulismus," as the Germans call the "sausage-poison disease." He was, however, in doubt as to the mode of action of this poison, directly as a neurotic, or secondarily as being a ferment whose decomposition products poisoned the blood, and thus acted upon the cerebro-spinal and sympathetic systems. In one way his results were positive, for they showed that the new poison was not an analogue of any of the ordinary ferments, for neither prolonged boiling at 100°, nor treatment with absolute alcohol, was able to destroy its activity; *a fortiori*, it could not be a living organism.

Like other observers, Panum found that symptoms varied with the dose, and according to the size, age, and strength of

the animal. A large dose, administered intra-venously, was rapidly followed by death, preceded by violent cramps, involuntary evacuations, labored breathing, pallor of skin, feeble pulse, mydriasis, and ocular proptosis. No lesions of importance were found post-mortem, but the blood was dark, refused to coagulate promptly, and was frequently diffused into the extra-vascular tissues. Putrefaction was extremely rapid. With a non-lethal dose, the access of symptoms was slower; after a quarter to a half hour, or even longer, less violent in action; and often the subjects survived, but were invariably made extremely ill.

Panum also isolated a curious narcotic substance, easily separated from the "putrid poison" by its solubility in alcohol. When injected into the jugular of a dog, the animal quickly fell into a deep sleep, which continued unbroken for twenty-four hours, after which it awoke, apparently in perfect health.

In the case of this distinguished investigator, as is so often the case, the scientific world was far too tardy in its recognition of his labors, for he wrote in Danish, and his papers attracted very little attention at first. Happily, however, the whirligig of time brought its revenge, for Panum lived long enough to enjoy the honor so amply due him.

Next in order of time come Bence-Jones and Dupré in 1866, with Hemmer and Schwenninger about the same period. The last of these laid great stress on the fact that various stages of putridity give rise to very different products, with varying toxicity.

The work of Jones and his colleague was upon the liver, whence they derived a curious body, whose sulphuric acid solution shows the familiar quinine fluorescence; whence they not unnaturally christened their new product "Animal chinoidine." This has since been found abundantly in all the tissues, but especially in the nerves, and gives many of the familiar alkaloidal reactions. In sheep's liver it is present in the proportion of a gramme per pound.

Since Bence-Jones and Dupré, the best known worker on this body is Marinozuco (1881–'85).

About 1868, Bergmann and Schmiedeberg isolated what they called "sepsine," as a sulphate, from putrid yeast and blood. It forms needle crystals, of which 0.01 gramme causes vomiting and dysenteric stools in dogs, with death in a short time. It was now hoped that Panum's "putrid poison" had been isolated, but farther study reveals marked differences in their effect upon animals. This new ptomaine is somewhat rare in putrid materials, seldom found in blood, and never in pus, I believe.

Bergmann himself finds that methods which extract "sepsine" from yeast will not show it in other substances, nor was he always successful in obtaining it even from yeast. Its quantity is usually very small when it is present; hence not enough can be extracted for an ultimate analysis, and we are yet in the dark as to its exact chemical composition.

In 1869, Zuelzer and Sonnenschein succeeded in preparing an extract from putrid meat which contained a nitrogenous base whose physiological effects resemble those of atropine and hyoscyamine; that is, it causes mydriasis, intestinal paralysis, and accelerated pulse, but it is uncertain and fickle in its action, as it rapidly changes from age, and varies in all its properties with the stage of decay at which it is extracted. This ptomaine is found also in typhoid cadavera, and it is thought that to its presence before death may be due the well known belladonna-like delirium often seen in the later stages of this disease.

From 1870 on, the literature of the cadaveric alkaloids is voluminous, and time permits mention of only a few among many.

The Italian, Selmi, must not be forgotten, for he it was who first of all suggested the word "ptomaine," and who much advanced our subject by his labor. He proved that several of these bodies can often be extracted from one sample of putrid flesh by first acidifying the aqueous solution and extracting with ether (A), then neutralising the acid by an alkali and re-washing with ether (B), again washing the alkaline solution with chloroform (C), and again with amylic alcohol (D), and that even then other ptomaines yet re-

mained, insoluble in any reagent yet used, while the alkaloids obtained by (A), (B), (C), and (D) may be widely apart as to properties and interest. This gives us an idea of the immense number of these products that probably exist, and chemists at once took the hint and began work, and to-day the field is busy with them.

One other reason why Selmi deserves great credit is this: He demonstrated what had been already suspected,—that these bodies give reactions almost the same, in many cases, as those of vegetable alkaloids, such as atropine, digitaline, morphine, strychnine, and the like, and at one time our toxicologists were justly much alarmed lest this fact might open the door to wholesale poisoning, through the difficulty of proving whether a poisonous body, giving alkaloidal reactions and extracted from a human cadaver, was the cause of death by design, or accident, or was the result of post-mortem changes.

In 1876, the first ultimate analysis of a putrefactive alkaloid was made by Nencki, who determined the formula of an isomer of "collidine."

Soon after this, Rörsch and Fassbender, in using the Stas-Otto method in a case of suspected criminal poisoning, found yet another ptomaine, very like digitaline in its reactions, except that it is destitute of the characteristic bitter taste. And since then, Gunning has found the same body in poisonous "Leber-wurst."

Schwanert separated a new base, which imitates nicotine and coniine in many ways,—a yellow oil, smelling like "propylamine," and, according to Selmi, can be differentiated chemically from the vegetable alkaloids with the greatest difficulty only.

Liebermann has also isolated another body much like coniine, but its odor is different, and it is not volatile. Fortunately it is non-poisonous, and does not distil below 200° C, while coniine vaporises at 135° C. In most other respects the reactions are absolutely identical.

Another base, discovered by Selmi, is a violent poison, producing tetanus, great mydriasis, paralysis, and death.

He also isolated, from old alcohol long used for preserving anatomical preparations, another volatile base; this even imitates the coniine odor. It is also found in the yolk of stale eggs, while from their albumen Selmi has isolated another, which is crystallisable, and which acts upon frogs very much like curare.

A peculiar class of ptomaines is found in bodies, whose extremely slow decomposition is the result of their impregnation with arsenic, either for embalming purposes or in the case of poisoning. These bases are called the "arsines," and many of them are extremely poisonous, although not containing any arsenic themselves. Most of them, I believe, are crystalline; one is fully as deadly as strychnine; another produces effects comparable to a mixture of morphia and digitaline, and so on.

Lombroso's work, in 1871, is very interesting, for he obtained an extract from mouldy corn-meal which threw animals into tetanus. This new fact at once shed great light upon the well known cases of sporadic illness long observed amongst the peasants of Lombardy, who live on "polenta," a sort of hominy made from the meal of maize, often spoiled before cooking, and always made in such large quantities that the "polenta" is sure to be fermented long before the people can eat the last of the batch. It is said that if the slices of "polenta" are well fried in oil before eating, the poisonous symptoms fail to appear. This would show that the "ptomaine" is of a volatile nature, or, at least, decomposed at that temperature.

Curiously enough, five years later another investigation by Brugnatelli and Zanoni proved that such meal also contains a second and non-crystallisable base, which not only produces tetanus, but even gives the color reactions of strychnia as well, thus doubly tending to puzzle the already bewildered toxicologist.

Brieger, of Berlin, has isolated and ultimately analysed several ptomaines. Among others, he obtained from putrid flesh "neuridine" $C_5H_{14}N_2$, and "neurine" $C_5H_{13}NO$;

the former harmless, the latter a poison. From putrid fish he separated a yet nameless poisonous base, $C_2H_4(NH_2)_2$, "muscarine" $C_5H_{15}NO_3$, the poison of the mushroom and toadstool family, and several other bodies.

From a cadaver decomposing fourteen days he obtained "mydaleine," a poison, and from one of four months, the poisonous "mydatoxine" $C_6H_{13}NO_2$, and "methylguanadine," also toxic. From poisonous mussels, the cause of frequent fatalities, the "mytilotoxine" $C_6H_{15}NO$, and from pure cultures of the typhoid bacillus, given him by Koch and Eberth, he separated an alkaloid producing enteric fever, the so called "typhotoxine," and from cultures of Rosenbach's tetanus bacillus, the alkaloid "tetanine," which causes the disease and has been extracted from an arm amputated for tetanus, immediately after the operation, so that this is doubtless *not* a product of putrefaction.

Vaughan's discovery of "tyrotoxicon," the chief cause of cheese and milk poisoning, is too recent to be forgotten (1885), and has been confirmed by very many, especially in cases of ice cream poisoning, among others, by the writer of these words.

Nicati, Koch, Rietsch, and others find a ptomaine in cultures of the cholera bacillus; the same is true of Smith and Salmon as regards cultures of the hog cholera germ; of Hoffa, in the case of the bacillus anthracis, beside several other cases that might be cited, all showing that it is *not* the specific bacillus that kills the patient, but the material that the germ produces as it grows—its excreta, in fact!

For many years past, cases of death from shell-fish have been reported,—the "mytilus edulis," or common mussel, being the chief sinner in this respect, and the symptoms being referable to three kinds of poison, in the various cases. Some patients escape with severe gastro-intestinal disturbances; others have those more purely nervous, with urticaria, heat, itching, and extreme dyspnoea, relieved by ether; while a third class of sufferers exhibit a quasi alcoholic intoxication, paralysis, coma, and death.

All sorts of theories have been advanced,—that the poison was copper, from the sheathing of vessels to which the mytili adhered; but copper gives no such symptoms, nor can copper be shown in the bivalves by analysis.

Edwards's theory was personal idiosyncracy, but this fails when every one who eats is ill, as in Combe's and Schmidtmann's cases.

Others consider that the effects are due to certain medusae, which are the food of the mytili during the summer, and this is advanced by L'Amoroux, Mohring, De Beume, and others, and certain cases may be due to this cause.

Another theory is that of Barrow, who thinks that mussels are always poisonous during the breeding season; but cases have been reported in almost every month of the year.

There is also reason to think that not only are certain varieties of the shell-fish always toxic, but that the edible kinds can, as Schmidtmann and Virchow proved to us, be made poisonous by planting them in filthy water for two or three weeks, and then be made again fit for food by removing to clean, flowing salt water for a month. This was demonstrated by these observers over and over again upon the Wilhelmshaven casualties a few years ago.

The poison has been isolated by Brieger, and named "mytilotoxin," and is thought to be the product of a disease due to residence in the stagnant and dirty water of docks,—the bivalves found in the clear tidal water being harmless.

Poisonous oysters and eels have often caused illness, and even death, and on several such occasions analysis has shown the presence of a ptomaine (Vaughan, Novy, et alii).

The most important source of food-poisoning, at least in Germany, is the omnipresent sausage, causing the disease variously known as "botulismus" or "allantiasis," many epidemics of which have been reported, beside an infinity of isolated cases. The symptoms vary, as with poisonous mussels.

In 1820, Kerner had collected the statistics of 76 cases, with 37 deaths, and by 1822 his list reached 155, of which 84,

or over 50%, were fatal, while Müller reported one epidemic which gave a fatality of less than 2%. So we see that the botulismic virulence is far from being a constant quantity.

Wurtemburg and Baden, the home of "blut-wurst," are also the favorite haunts of this disease, nor is the cause far to seek: in these parts they have the habit of preserving the blood of sheep, oxen, and goats for several days in wooden tanks. Here it becomes more or less putrid, but is none the less used up in sausages, which, as they are very thick, cure slowly, and very often the centres are found slimy with rottenness! The active cause has not yet been certainly isolated, but beyond doubt it is an easily decomposable alkaloid, and will soon, we trust, be finally separated and analysed.

In the case of poisonous ham, much confusion has arisen, for the effects of "trichina spiralis" and other parasites are often mixed up with those due to putrefactive changes. The most startling English epidemic is that at Welback in 1880. Here a four days sale took place upon the Duke of Portland's property, attended by crowds of people, who lunched on ham, and seventy-two persons were poisoned, of whom only four died. The symptoms were both intestinal and nervous, death being preceded by a choleraic collapse (Ballard). The cause being traced to the ham, Prof. Klein found therein a bacillus, but, most strangely, no attempt seems to have been made to isolate the ptomaine!

Later on, fifteen cases arose from eating baked pork, with one death. Here the same bacillus was found by Klein in the blood, pericardial fluid, and lungs of the victim.

The epidemic at Middleburg, in Holland, is also remarkable. Here, on August 29, 1887, 256 soldiers and 36 civilians were made ill by eating beef from a cow suffering from puerperal fever when slaughtered. No accurate chemical examination was made, unfortunately.

The only larger epidemic is that of Zurich in 1839, where 600 were ill at one time from feeding on decomposed veal and ham. In *all* these cases there can now be no doubt that the efficient cause was poisonous ptomaines.

Poisonous canned food is quite frequently mentioned in this country, and I am well aware that strenuous efforts have been made to ascribe all such cases to the effects of the chloride of zinc, used as "soldering fluid." There can be no doubt that in the vast majority of cases the effects must be due to putrefactive changes.

Similar results may accrue even in the cases of vegetables and fruit, as was reported by Ashworth. Here three people died from eating canned apricots. One was an infant of eight days, poisoned by its mother's breast; it died in an hour, while the mother survived her child more than forty hours. The father died after five or six days only, and all with symptoms of poisoning very like those of "tyrotoxicon," which brings us to poisonous milk products, cases of which have been noticed for many years, although it has been reserved for our American chemists to bear off the honor of isolating the poisonous alkaloid itself.

In 1883–'84, about 300 cases of cheese-poisoning were reported to the Michigan State Board of Health, varying in severity in direct proportion to the amount of cheese eaten by the victim; but, fortunately, none were fatal. The symptoms were those of a violent irritant poison, and many physicians thought them due to arsenic. All these cases came from using parts of only twelve cheeses, from each of which a specimen was secured for analysis by Prof. Vaughan, director of the hygienic laboratory in the university at Ann Arbor. He found no suspicious smell or taste, and made an aqueous extract, filtered, evaporated to constant weight at 100° C., and tested the residue, but found it innocuous. These results showed that the poison was either volatile, or decomposed at or below 100° C.

A fresh aqueous extract was made alkaline by sodium hydrate, and well washed by ether in successive portions. On pipetting off the ether it was allowed spontaneously to evaporate at a low temperature, and left a violently poisonous residue. By repeating the process the ptomaine is purified, and after standing in vacuo over hydrogen sulphate, it crys-

tallises out in needles. From sixteen kilos of one cheese Vaughan obtained 0.5 gramme, and from as much of another cheese only about 0.1 gramme; but there can be no question that no process yet known will remove *all* the poison, which is named by its discoverer tyrotoxicon, from the Greek "turos," a cheese.

In 1887, Wallace found it in another severe epidemic, where at least fifty were ill. Lately Wolff reports it as the cause of the epidemic at Shamokin, Penn.

In 1885, "tyrotoxicon" was again demonstrated by its discoverer in milk which had stood sealed up for three months and more in glass bottles; and the next year Newton and Wallace were studying the great Long Branch epidemic in August, where twenty-four people sickened at one hotel and nineteen at another, and a week later thirty cases appeared at a third hotel. Dirty materials and all other foods were first excluded, and it was then proved that all the sick had used milk, while those were well who took none at *that particular* meal, the 6 P. M. dinner. One man, very fond of the article, drank about a quart, and nearly died!

The cows, their food and shelter, with all concomitants, were found *comme il faut*,—but one very careless habit prevailed at noon, when the whole milking was put, hot from the cow, into cans, jolted over a rough road for eight miles in the hottest part of the day in a very hot summer, and delivered to the hotels for use at the evening meal. Of course decomposition set in on the way, and abundance of "tyrotoxicon" was found in the milk used by the victims.

Since this time, Schearer, Firth, of the British army, Novy, the writer, and many others, have found the same ptomaine in poisonous milk.

Should such material be used for ice cream, we have the same serious results; and the alkaloid has been found at Lawton, Mich., in the 1886 epidemic, by various observers, at several places, and by the author in cases seen three years ago in Brooklyn.

The great question, how germs cause disease, can alone be

answered by showing that bacilli form chemical poisons, and the proof of this theory now amounts to a positive demonstration. We find in every case that a particular micro-organism always produces its own poison, acting differently in different diseases, sometimes locally, sometimes generally, which is well shown by Nielsen's classification of the germ diseases.

CLASS I. General Acute Mycoses, as Anthrax and Mouse-Septicaemia; one variety (A), Intermittent Acute Mycoses, as

Recurrent } Fever.
Relapsing }

CLASS II. Local development of Bacteria; growing only at point of infection.

A. Ptomaine absorbed, causing general intoxication, as in

- Cholera,
- Tetanus,
- Putrid intoxication, etc.

B. General intoxication, but excessive local inflammatory changes, as

- Malignant oedema,
- Erysipelas,
- Pneumonia.

C. Local necrosis, as

- Hospital gangrene,
- Gangrene foudroyante.

D. Local suppuration, as

Abscess.

CLASS III. Blood Mycoses, secondary local lesions, of three classes,

Inflammatory,	1
Suppurative,	2
Necrotic,	3

Variety 1 embraces Measles, Scarlatina, Acute Articular Rheumatism, and Beri-Beri in men; Chicken Cholera in fowls.

Varieties 2 and 3 embrace those having secondary suppurative or necrotic lesions, as in

- Variola,
- Diphtheria,
- Osteo-Myelitis.

CLASS IV. Mycoses with proliferation of tissue, or infective ulcers, all showing a tendency to degenerative changes and necrosis, as

- Enteric fever,
- Glanders,
- Tuberculosis,
- Leprosy,
- Syphilis.

The name "Leucomaine" has been invented to designate the basic bodies found in living and healthy tissues, arising from fermentation or retrograde metamorphoses. These are abundantly present in the human body, and even the expired air contains highly poisonous organic vapors. From this fact we now know that the frequent headaches and nausea caused by ill ventilated rooms are not to be entirely laid to the account of the carbonic acid present, the organic contamination being a far more sufficient cause.

Brown-Sequard demonstrated that the condensed vapors exhaled from a dog's lungs, when injected into other animals, caused death usually inside of twenty-four hours.

As to the saliva, Gautier found various toxic bodies therein, and Pasteur's experiments in this line are now become too classic to need recital in this presence.

Selmi and many others have isolated bases from *fresh* tissues, some of which are very poisonous; and there is now good reason to believe that some, at least, of our many diseases may be due to the increased formation, or diminished elimination, of such alkaloids.

For example: Brunton tells us that "biliousness" is apt to occur in all who eat largely of flesh, and is due to the accumulation of poisonous bases, the products of the breaking down of their nitrogenous food.

Common colds are best explained by sudden stoppage of the cutaneous excretory function. The relief due to starting excretion all over the body is well known.

One of the greatest living physicians has lately startled the London medical world by showing that chlorosis is usually nothing *but faecal poisoning*, for he has quickly cured very many cases by free and persistent use of mild laxatives.

Another example, well known to the military surgeon, is "fatigue fever," coming on in raw recruits after too long marches.

All of us, no doubt, have seen such cases, in acute disease with constipation and non-elimination, where serious symptoms of typhoid, etc., have at once vanished after a free catharsis.

Again: It is found that *fresh* normal faeces contain several highly poisonous bodies, causing violent convulsions in rabbits when used subcutaneously.

Brunton calculates that every healthy adult male forms enough poisonous "leucomaines" every twenty-four hours to kill himself with, if all were reabsorbed at one time; and the cause of such a death he would call "stercoraemia."

In uraemia it is *not* the urea alone that does the mischief, but other substances a thousand-fold more venomous, that are retained behind and poison the unhappy victim!

This extremely imperfect, because brief, sketch of an almost illimitable field is respectfully submitted to this Association as an endeavor to call its attention to facts as yet scarcely known to most of us, and yet of vital interest and importance to every portion of the theory and practice of the Healing Art. If this object has been in *any* degree attained, the author's time and pains will not have been in vain.

Dr. E. M. Moore said he did not know when he had listened to a paper with so much gratification as the one that had just been read: it brought up our knowledge to the last point in this new field. He wished, however, to understand more clearly about a ptomaine poisoning, which, if he remembered rightly, had been said to arise from vegetable food.

Dr. Sizer replied that he had spoken of a tetanic disorder brought about as the result of decomposition of corn meal; that the substance had been isolated in the corn meal as tetanine; that it was chemically quite similar to the tetanine produced in animal substances by the microbe, and would produce tetanus just the same; that tetanine had been formed by the action of the microbe upon bouillon, and then separated and used for the purpose of producing tetanus.

In answer to President Cronyn, Dr. Sizer stated that decomposition of the corn meal occurred in the polenta of the Italians. It was long ago found that the disease existed among the Italians, but by causing them to use good meal there were no more accidents.

Dr. Cronyn remarked that polenta was made from the Italian "maize," or millet (the setaria Italica, or "grano-turco"), not from the Indian maize. They made enormous cakes of it, and allowed it to stand for days and even for weeks.

Dr. C. W. Brown said that he had been greatly interested in the matter of tetanus. In a paper read before the International Medical Con-

gress upon this subject he gave a description of some experiments made upon animals. In place of using decomposing substances, he took the blood directly from the jugular of a horse suffering, and finally dying, from traumatic tetanus, following castration, and injected that blood into rabbits and kittens. All the kittens and some of the rabbits died of tetanus in twenty-four hours. That was quite conclusive to him that there was some specific poison that produced the disease. Blood taken from a healthy horse produced no effect upon the kittens or rabbits.

PTOMAINES AS REGULAR CONSTITUENTS OF URINE IN CYSTINURIA.

By Charles Rice, Ph. D., of New York County.

October 9, 1888.

Messrs. Udransky and Baumann have recently ascertained that benzoyl chloride, in the presence of a caustic alkali, converts diamines into a crystalline benzoyl compound, insoluble in water. Even very minute quantities of diamines may thus be separated. A detailed account of the reaction need not be given here, but reference may be made to the original in the "Berichte der Deutsch. Chem. Ges.," 1888, 2,744.

Some time ago Brieger isolated a ptomaine which he called cadaverine. This was subsequently identified by Ladenburg as penta-methylene-diamine. Brieger also discovered another ptomaine, which turned out to have the composition of tetra-methylene-diamine, but had so far not been shown to be identical with the latter.

The authors of the paper had occasion, during some nine months, to make regular periodical examinations of the freshly voided urine of a patient in the University Clinic at Freiburg, who had suffered for years from cystinuria and catarrh of the bladder. Having discovered a reagent for the detection and separation of diamines, and having applied this reagent to the urine in question, they discovered in it at least three diamines as regular constituents. Penta-methyl-diamine (or Brieger's cadaverine) constituted the largest portion, about two thirds; the proportion of the tetra compound is about one fifth.

From fifty days' urine about 30 grammes of the crystalline benzoyl compounds were obtained, of which about 20 gm. were cadaverine.

The authors have, therefore, for the first time shown that

ptomaines may occur in natural secretions, such as urine. Since these ptomaines were found to bear a constant ratio to the quantity of cystin excreted, it is probable that there is a necessary relationship between these substances. The authors hope to be able to throw some light on the subject after having continued their bacteriological investigations of the intestinal canal.

THE ORIGIN AND MEDICAL TREATMENT OF URIC ACID CALCULI OF THE KIDNEY.

By William D. Garlock, M. D., of Herkimer County.

October 9, 1888.

Uric acid stands as a type of those deleterious and waste products of normal and abnormal metabolism which have been shown to enter largely into the aetiology of disease. Its importance is so great that it has been elevated to the dignity of having a diathesis named after it, while the painful and obstinate disorders which it causes, and the Protean nature of the symptoms produced by it, make it a most interesting and important study to the medical practitioner.

I think the time has nearly gone by when lithiasis, or the uric acid diathesis, is taken as a sign of genteel birth, or as conclusive evidence of luxurious living, as it may torment the poor seamstress as well as the corpulent alderman, and add its pangs to fatigue and hunger as well as to lethargic satiety.

The introduction of nourishment into the system, the transformations and chemical changes necessary to utilise the absorbed products, either in repairing used tissues or in the production of energy and vitality, and the removal of the waste and useless products,—or, in a word, *alimentation*, *metabolism*, *excretion*,—present wide fields for investigation, diversified by many features, and all of them more or less important in the study of our subject. The older writers on uric acid troubles wrote mostly of the first of these general subjects, and gave to dietetics the almost exclusive credit of causing lithic acid disorders. Later, when uric acid came to be studied more fully in the urine and in the tophi of gout, excretion was hailed as of primal importance, while more recently the metabolism going on in the cells, in their nutri-

tive and functional capacities, has been regarded as of greatest importance in the aetiology.

Uric acid seems to be one of the final products of proteid metabolism. It differs from urea in its being less completely oxidised, because one molecule of uric acid can, by oxidation, be split up into two molecules of urea and one molecule of mesoxalic acid. Foster thinks that urea is not formed by the oxidation of uric acid in the system, but that each represents the final product in different lines of proteid metabolism. This may be illustrated by alluding to the urine of birds and reptiles, where uric acid replaces urea as the normal final product. Uric acid seems to be adapted to those conditions of life where the ash of proteids is better removed in a solid than in a liquid form; while urea, from its ready solubility, represents the great final product in the liquid urinary excretion of mammals. The uric acid diathesis may, therefore, be considered as a partial return to a natural condition lower down in the evolutionary line, or, perhaps more properly, as a failure to maintain the high developmental state of mammals, whose systems are adapted, not to a solid, but to a liquid, excretion of proteid waste.

Normally, eight to ten grains of uric acid in the form of sodium, ammonium, or potassium urates are daily excreted by the kidneys. This amount is increased by the use of animal, and diminished by vegetable, diet. It is reduced to a minimum, but does not completely disappear, during complete abstinence. The urine of the herbivora naturally contains hippuric acid instead of uric acid, but during abstinence the hippuric acid disappears, and uric acid appears, because then they are living upon their own bodies, and are practically carnivorous.

It is not entirely clear where uric acid first appears in the system. It is, however, found in the blood, the liver, and the spleen, as well as in the urine. The liver contains uric acid possibly as a product of the hepatic function of furthering the oxidation of proteid waste preparatory to its final excretion. The spleen contains a great amount of, and a great many of,

the so called extractives, as succinic and other similar acids, leucin, xanthin, etc., and uric acid. Foster says that the constant presence of uric acid in the spleen is remarkable, especially since it is found even in the spleens of herbivora whose urine contains none. In ordinary pyrexia and ague, the increase of uric acid in the urine seems to run parallel to the turgescence, and therefore presumably to the activity of the spleen. These facts are suggestive at least of some splenic importance in proteid metabolism leading to the formation of uric acid.

Dr. Latham, in the Croonian lectures for 1888, holds that uric acid compounds are formed by conjugation of residues of glycocine with residues of urea. He accounts for the presence of sodium urate in the blood by the imperfect metabolism of glycocine. He thinks that this conjugation occurs in the kidney.

The removal of uric acid from the system mainly takes place through the kidneys. Normally, as soon as the almost insoluble uric acid is formed, it seizes a part of the sodium base of the sodium phosphate of the blood, reducing the remainder to the acid sodium phosphate of the urine, while, instead of uric acid, we have the urate of sodium in the urine. If for any reason acids are present in the urine, which have a stronger affinity for sodium than has uric acid, and if there is not sodium enough to neutralise all the acids present, this formation of urate of sodium cannot take place. Potassium and ammonium urates are also found in the kidneys, but the chemical reactions are not so clearly understood as is the formation of sodium urate.

Uric acid is almost insoluble, requiring from 12,000 to 15,000 parts of cold water for its solution; but urates of sodium, potassium, and ammonium are freely soluble. If the conversion of uric acid into urates freely and completely takes place, the elimination of uric acid proceeds easily without causing any symptoms. If this change does not occur, the uric acid becomes deposited in a crystalline form, under healthy circumstances, and into other forms under certain

unhealthy conditions, which are not completely known, but which often lead to the building up of calculi. These conditions will now be referred to somewhat in detail.

In 1857, George Rainey succeeded in forming, by separation from saturated solutions of a saline in gum arabic mucilage, spherules having all the hardness of pearls, and showing radial and concentric markings. When two spheres touched, they gradually coalesced into one. He demonstrated that his spheres were built up by slow coalescence of molecules, and not according to the usual mode of crystallisation.

W. M. Ord and others have followed up Rainey's investigations, and have formulated some laws which are supposed to govern the formation of calculi. Summed up briefly, these investigations show that colloid substances present in the menstruum determine greatly the form which the dissolved substances will take on being deposited. If no colloid is present, the natural crystalline form is assumed; but if colloids are present, there is a tendency for these crystals to become broken down and turned into spheres, or spheroids, or molecules. The forms assumed vary somewhat with the amount of colloid present, and also according to the temperature at which the action takes place,—the higher the temperature the greater being the potency of the colloid, and to some extent varying with the nature of the colloid present. Mucus is less efficient than muco-pus, and the power of both is greatly intensified by partial degeneration. Other substances beside uric acid obey the same laws, but Ord thinks that a denser colloid is required to cause coalescence of crystals of oxalate of lime than is needed for uric acid. Any increase or diminution of the amount of uric acid in the urine will have its effect on the formation of calculi. The more uric acid there is present, the greater is the liability to the formation of calculi, and the more rapid the increase in size of any already formed.

Summing up the various factors to be considered while treating uric acid calculus of the kidney, we present them under various heads as,—

1. Alimentation, including dietetics, etc.

2. Metabolism, including diathesis and excretion.
3. Habits of life, climate, occupation, etc.
4. Local disorders producing colloids, or influencing the production or excretion of uric acid.

These factors must be constantly kept in mind in the treatment of the uric acid diathesis, and in the effort to remove stone in the kidney by solvent remedies; but in the discussion of them it will be impossible to separate them entirely, as all dietetic or other measures have an influence on metabolism and excretion, as well as on the character of the proximate principles introduced into the body.

The fact that herbivora have normally hippuric acid instead of uric acid in their urine, and the knowledge that meat diet increases the amount of uric acid in the urine, might lead one to suppose that vegetable diet should be exclusively adopted in these cases; but as the oxidation of the tissues and waste products of the system is less on vegetable than on mixed diet, and as uric acid is one of the products formed under conditions of deficient oxidation, apparently the question arises whether the increase in metabolism and oxidation, induced by *partial* meat diet, will not promote elimination in a normal way, and more than counterbalance the increased production of proteid waste. There is not so much work thrown upon the digestive organs in the changing of animal albumen into a condition ready for absorption as is required for the assimilation of vegetable albumen. Again: On vegetable diet more starch and cellulose are taken than is required in order that the proper amount of nitrogenous food may be had; this again entails extra work upon the digestive organs, and especially upon the liver, whose glycogenic function becomes overburdened, while the oxidising power which it has over the peccant matters resulting from the functional activities of the various tissues becomes so impaired that there is a tendency for uric acid to be formed instead of urea. Uric acid is more abundantly formed in biliousness and in bilious individuals, and, of all causes of hepatic torpor, indolence, with a diet rich in carbohydrates, is perhaps the most important. Moderation

in diet is probably of more importance than exclusion of any particular kind of food. The stomach and liver must not be overloaded, and excess of nutrient material in the blood exhausts metabolic energy, and leads to imperfect excretion.

A mixed diet promotes good feeling and vigor, with increased muscular and mental activity, heightened blood pressure, freer breathing, and, in general, more complete oxidation, with better elimination of peccant matter by all the emunctories. Meat in the diet increases the number of the blood corpuscles, and so increases the power of the blood to carry oxygen to all the tissues. Milk diet, if it could be sustained for a long time, might perhaps be best of all, and it should enter largely into any diet adopted for uric acid troubles. It seems, all things considered, that the best diet for lithiasis is one embodying, in proper proportion and amount, the various albuminous, fatty, starchy, and saccharine elements, selecting those articles of food that are as easily digested and absorbed as possible; and to do this it is probable that the albumen should be of animal rather than of vegetable origin.

Physical exercise, by increasing oxidation and quickening the circulation, will tend to remove uric acid, and also lead rather to those tissue changes, the final product of which is urea rather than uric acid. Bathing, cheerfulness of disposition, congeniality of surroundings and occupation, and other similar influences, are desirable for their quickening power, and constitute no small element of the peculiar potency of a course at mineral springs.

Drinking freely of water will increase not only the total amount of urine passed, but, by diluting it, will increase its solvent power, because of its increased quantity and diminution of specific gravity. It causes the excretion of a larger total of oxidised and effete matter, and thus virtually flushes the system, freeing all the emunctories.

The fact that uric acid accumulates in the blood in febrile diseases, disorders of digestion, and in anaemia, should be constantly borne in mind in treating lithiasis. Medicines

may often be of benefit when they tend to improve any of the organs engaged in the metabolism leading to uric acid formation. Tonics, bitters, acids, alkalies, pepsin, etc., for gastric derangements; laxatives and other remedies having a regulative effect on the liver and bowels; haematinics, to enrich the blood and increase its oxidising power; cardiac tonics and stimulants, diuretics, and many other classes of remedies,—may be utilized in a general way to combat the tendency to uric acid production.

The remedial treatment of stone, or the attempt to dissolve it by medicinal agents introduced through the stomach, has received much attention at various times. Proprietary medicines have sometimes attained to great notoriety, especially that of Joanna Stephens, who sold her formula to the British parliament for £5,000. The various mineral waters, and especially those of Vals and Vichy, are reputed to have considerable power to modify the uric acid diathesis; and they possibly exert a genuine solvent power on uric acid stones. It may be said that in general the carbonates, acetates, citrates, etc., of the alkalies, and especially those of lithium, sodium, and potassium, have been highly recommended for uric acid troubles. The combinations that naturally occur between the alkalies and uric acid have led to their general use in lithiasis. Preference has been given sometimes to one, sometimes to another, preparation. Since the acetates, citrates, malates, tartrates, carbonates, and bicarbonates, of the alkalies, are all eliminated in the urine as carbonates, that one should be chosen which will best agree with the individual peculiarities of each patient, employing the diuretic, laxative, and antacid properties of the various salts, as may be indicated, remembering that lithium has a higher valency in combination as an alkali, while potassium is somewhat depressing and weakening to the heart, which adapts it more to the plethoric and robust individuals, but rather contraindicates it in anaemic patients. Sodium is a milder alkali than potassium, is less depressing, and has a reputation as a biliary stimulant which adds to its virtue and availability in selected cases. Sodium

exists in much larger proportion in the blood than the other alkalies, and probably has a greater share in promoting osmosis. The recent tendency seems to set toward an increased appreciation of the value of sodium compounds in the treatment of uric acid calculi. Bartholow, in Pepper's System of Medicine, under the head of lithaemia, strongly condemns the use of sodium compounds in this state, claiming that urate of sodium is very insoluble, and basing his objections on this fact. According to the best light I can find, urate of sodium is soluble in 70 to 80 parts of cold water, and more soluble in warm. Now lithium and potassium urates are but little more soluble (1 in 60 and 1 in 45 parts, respectively), or from one fourth to one third more soluble than the corresponding sodium salt. All the uric acid daily excreted, if in the form of urate of soda, could easily be dissolved in much less than one pint of urine ; so it seems as if Bartholow's objections are theoretical rather than practical. Dickinson condemns soda salts and Vichy water in a very positive manner, asserting that a fragment of stone increased in weight while immersed in a solution of carbonate of soda. Roberts, in his experiments, found that incrustation only occurred if the solution was too strong, and this was probably the condition in Dickinson's experiment. The investigations of Pfeiffer and Bergmann give positive evidence in favor of soda salts, and are of such a character that they more than counterbalance negative or theoretical evidence of seemingly equal value. Roberts, of Manchester, very strongly recommended potassium, while Garrod as strongly claimed that lithium salts were best to use.

Since these views were published, new work of a more scientific kind has been done, leading to somewhat different conclusions. Pfeiffer and Bergmann gave to various persons water from various mineral springs, and solutions of various alkalies in different degrees of dilution, and then used the urine passed by these individuals, while taking the remedies, to study the effect of it upon uric acid. After experimenting with a number of alkaline mineral waters, as Vals, Vichy,

etc., and with solutions of bicarbonate of soda, effervescing carbonate of lithium and citrate of potash, the remedy called "litholydium," and other vaunted cures, they found that these agents varied somewhat in their efficacy, and that the greatest solvent power could be attributed to the urine of individuals taking solutions of bicarbonate of sodium, and especially if using the natural waters containing it largely, as those of Vals or Vichy, with a preference for the former, or the one containing the greater amount of bicarbonate of sodium. With these agents they could reduce the acidity of the urine, and even render it alkaline; but it is not desirable in practice to induce great alkalinity, as then there is a tendency to the deposition of phosphatic layers about any uric acid calculus that may be present, thus promoting incrustation rather than solution. The urine should be neutral, or only faintly alkaline, and the freer the secretion the better.

Residence at the springs is better than any home use of the water, or any of its substitutes; but the various granular effervescent Vichy and other salts to be obtained are useful, and seem to exert a very beneficial effect. Buffalo Lithia Water has apparently some virtue, while probably almost any alkaline water, especially if it be effervescent, will be beneficial as a diuretic, a diluent, or, more directly, as an alkali. The Vichy of the soda fountain, if it honestly represents the composition of the natural water, is a very available remedy.

Drugs may be selected to modify in various ways, according to indications, the secretions and circulation of the mucous surfaces of the urinary organs which have relations to the urine. Anything which will lessen the amount of colloid matter in the pelvis and calices of the kidney will have great prophylactic power over renal calculi. Reduction of acidity of the urine by making it more bland, reduces irritation if present.

Of all local conditions, catarrh of the pelvis of the kidney, or pyelitis, has perhaps the greatest power to promote stone formation, and this is greatly intensified, especially for phosphatic stone, if ammoniacal degeneration supervene; but

this is not so common in the kidney as it is in the bladder. If alkalies are given in excess, they may tend to increase this alkaline fermentation, and the indications may be rather for acids than for alkalies; and of these, phosphoric acid and benzoic acid are available, but are rather disappointing. The various vegetable remedies having reputed alterative powers over the mucous surfaces, as cubeb, copaiba, corn-silk, pichi, etc., may be tried, and will, if properly used, probably do some good. If the pyelitis is intense, or if a calculus is already present in the pelvis of the kidney, rest and quiet may be required to lessen the mechanical irritation of the foreign body.

Whoever would successfully treat uric acid troubles must remember that he is not conducting a laboratory experiment, but is dealing with a complex and often puzzling organisation, with many parts having diverse functions, but any one of which may influence the working of the whole. There are no specifics to be depended upon, but in all cases the treatment is a rational one, requiring study, time, and patience. The system should be led into those habits and conditions where every organ gets its proper nourishment and does its proper work smoothly, and without excesses or deficiencies of any kind. Then the system can free itself easily of its effete matter, and we shall at least be able to hope for less trouble in the excretion of uric acid and its combinations.

HICCOUGH, WITH NOTES ON TREATMENT.

By Frederick W. Putnam, M. D., of Broome County.

October 9, 1888.

By hiccough, we understand a clonic spasm of the diaphragm during the act of a quick inspiration, with partial or complete closure of the glottis, and then a short expiration, giving rise to a peculiar and characteristic sound, familiar to both physician and layman.

It may be present in peritonitis, pleurisy, pneumonia, uraemia, cholera, dysentery, extensive haemorrhages, injuries to the skull and cervical portion of the spinal column, diseases of the central nervous system, anaemia, chlorosis, cachexia, hysteria, malarial poisoning, gastric and intestinal diseases of all kinds, hepatic, uterine, and prostatic diseases, mediastinal tumors pressing upon the phrenic nerves, inflammation of the serous surfaces, aneurysms, pericarditis, fractured ribs, passage of renal and biliary calculi, strangulated hernia, diseases of the larynx, pharynx, etc.

The limits of a paper of this kind forbid dwelling upon the importance of hiccough as it occurs in each of these diseases and morbid conditions. I therefore content myself by considering briefly its significance in a general way, and devoting the major portion of the paper to its therapy.

The simplest and mildest form is the accidental hiccough of childhood. These cases are of very common occurrence, and are seldom brought to the notice of the physician. The symptom either stops of itself, or is controlled by one of the many domestic remedies or measures known to almost every household.

It may occur as a single symptom in the adult, independent of any disease or morbid condition, and without any known cause. These cases may be very simple, lasting only

for a brief time, or they may be very severe, lasting from a few hours to years. The simple cases are usually easily cured, but the more prolonged and severe ones may tax the skill and ingenuity of the physician to the utmost. A case of the kind is reported in St. Louis, which resisted all kinds of treatment for twenty years, the patient being a married lady. The husband finally secured a divorce, simply on account of the persistent hiccough.

It may result from direct irritation of the phrenic nerves and diaphragm. These cases are usually severe, and, of course, are not easily controlled as long as the exciting cause remains in operation.

It may be the result of reflex irritation. The irritation may be a strangulated hernia, or some morbid condition existing in the uterus, the prostate gland, or other distant organ. These cases do not always yield readily to treatment. A most persistent case of this type was finally cured by the formation of an abcess in the epigastric region, from which a number of needles were removed.

When it occurs, or is at all persistent, in acute or chronic peritonitis, cholera, dysentery, uraemia, or gangrene, it should always be considered as a symptom of very grave import.

It may also result from irritation of central origin, either in the upper part of the cervical portion of the cord, or the medulla.

A very superficial study of medical literature will convince the most skeptical that the more difficult a disease or morbid condition is to cure, the more specifics will be advanced by conscientious practitioners for its alleviation. As it occasionally becomes necessary to resort to special means to relieve hiccough, a great variety of remedies and remedial measures have, at different times, been advanced as specifics, or "almost specifics," for the relief of this symptom.

I shall only attempt to outline such notes on treatment as experience and reading have brought to my notice, and the time allotted to my paper will permit, as it would be impossible to exhaust the subject in so short a time.

For the accidental hiccough of childhood and early youth, special treatment is seldom required. Frequently a drink of water, a small lump of sugar, diverting the attention of the child, taking a small piece of ice, acid drinks, drinking a large amount of water at once, forced flexion of the head accompanied by firm pressure over the epigastrium, cracked ice, a sudden exclamation or unexpected loud noise or sharp command, will prove quite sufficient to stop the symptom. In similar cases occurring in adults, other measures are often required in addition to those mentioned.

Dr. A. G. Gibson, in the Edinburgh Medical Journal, April, 1886, calls attention to the Hippocratic aphorism: "Sneezing occurring after hiccough removes the hiccough." He suggests irritating the Schneiderian membrane, thereby producing sneezing. In some instances it may not be necessary to produce sneezing, simple irritation of the nasal mucous membrane being sufficient. While a useful procedure, yet it often fails. The following, emanating from the great state of Texas, is one of the many ways in which the above may be accomplished: "A sure cure for hiccough is a pinch of snuff." I am unable to state how large a "pinch" is required.

The following appears in a journal issued about forty years since: "Hold up high above your head two fingers of your hand, lean back in your seat, open your mouth and throat so as to give a full passage to your lungs, breathe very long and softly, and look very steadily at your fingers." The report does not state which hand or which fingers of the hand you are to hold up, and I judge it does not matter. I am of the opinion that, in certain cases, possibly of a neurotic temperament, the proceeding would prove successful.

M. Laënnec is credited with having stopped hiccough by magnetism. Dr. Robley Dunglison, in commenting on the fact, indicates that its application is limited to those possessing highly impressible habits, and to its effects upon the imagination. If a hypodermic injection of clear warm water will stop severe pain, through the belief on the part of the patient that a liberal supply of morphia is dissolved in the

water, it is not unreasonable to suppose that magnetism, or any form of mysterious treatment, will prove sufficient in susceptible cases.

Dr. Dresch, of Foix, France, describes the following method of curing singultus: "Close the external auditory canals with the fingers, exerting a certain degree of pressure; at the same time drink a few sips of any liquid whatever, the glass or cup being held to the lips by another person."

Wetting the lobe of the ear with cold water, or with any fluid which by its evaporation will produce a slight degree of refrigeration, will sometimes arrest it.

Forcible compression of the ribs and diaphragm, upward and backward, with forced flexion of the head, as recommended by Shaw, of Cincinnati, and Burke, of New York, is a most excellent measure, and will succeed in a great many instances of even severe hiccough.

A professional friend related to me the history of an interesting case, where the application of dry cups along each side of the spine, near the attachments of the diaphragm, produced prompt and permanent relief.

A somewhat novel and ingenious procedure, which, as far as I know, is not copy-righted, and which, like many other plans of treatment, is said to have been "tested many times without a failure," is as follows: Say to your friend something like this: "See how close together you can hold the tips of your fingers without touching. Now keep your elbows out free from your side. You can get your fingers closer than that. They are touching now. There, now, hold them so. Steady!" Withdrawing the attention of the patient, together with the slow breathing necessary to perform any delicate manipulation, explains the *modus operandi* of the measure, and often succeeds.

A case is reported in the Philadelphia Medical Times, where the passage of an oesophageal tube, repeated occasionally, cured an obstinate attack of hiccough.

Dr. J. M. W. Kitchen, of New York, recommends spraying the posterior wall of the pharynx by means of an atomiser,

using only pure water in cases of infants. The thought oc curred to me that possibly cocaine, or even wine of ipicac, as has recently been recommended by Murrell, of London, in cases of phthisis, might sometimes be of service. I have not found any mention of either of the latter two remedies in this manner, as a possible resort in intractable cases of hiccough. They at least possess the merit of being simple and harmless. Possibly, also, the hypodermic injection of cocaine might prove of service.

For the more severe and long continued cases, occurring without any known cause, or as a complication of any disease or morbid condition, the following remedies are recommended:

For hiccough occurring in peritonitis, I am inclined to believe that the inhalation of chloroform is the best treatment. I have had a little personal experience in this matter within the past year, and know that, in my own case, various other measures only produced, at best, very temporary relief. I would offer the suggestion that, in these cases, a liberal supply of chloroform be poured upon the handkerchief or inhaler, and suddenly brought near to the mouth, thereby producing a slight shock. I am convinced, from personal experience, that an attack can be much sooner stopped in this way than when the anaesthetic is cautiously administered. Great care must of course be taken that too great an amount be not used, and that, after the first few inspirations, more atmospheric air be allowed to enter the lungs. If administered too slowly, the patient may continue to hiccough for a considerable time after being anaesthetised. The inhalation of ether will also control the symptom when it occurs in peritonitis, but not so surely and promptly as chloroform.

The following notes, prepared by Dr. J. D. Sherer, of Waterford, and furnished by Dr. E. D. Ferguson, of Troy, the valued secretary of this Association, are worthy of record:

November 10, 1887, Dr. Dunlop, of Waterford, had an attack of indigestion, to similar attacks of which he had been subject at varying intervals for seven years. The attack of indigestion came on at about

two o'clock P. M., and between that hour and midnight he took, in all, ten grains of codeia to control pain. During the next day he felt tolerably comfortable, with the exception of a sore sensation below the border of the ribs on the left side. About eleven o'clock that night he took an enema of warm water, but the evacuation following was unsatisfactory, a large portion of the water being retained, and an hour later the hiccough developed. At six o'clock the next morning it ceased, but returned in two hours. Very simple remedies,—as vinegar and sugar, valerian, bismuth, etc.,—were taken during the day, as the symptoms were not particularly distressing. Sunday morning I began giving him ten grains each of chloral and bromide of potash, one minim of physostigma, and one half grain of acetate of morphia, in combination, every three hours, with occasional counter-irritation over the epigastrium. Chloroform was also given internally at long intervals, and this treatment was continued until Dr. Ferguson saw the case, in consultation, the next day at evening, without any appreciable effect. From ten P. M., Monday, till eight P. M., Tuesday, a period of twenty-two hours, the treatment was confined exclusively to chloral, and in that time fifteen grains were administered every hour at first, and later every two hours, until one hundred and ninety-five grains had been taken without apparent benefit. During the next twenty-four hours, valerian was occasionally administered, with the same result as before. The treatment was then changed to the hypodermic injection of morphia and atropia with the use of electricity, and this course was pursued exclusively to the final termination of the hiccough. During this time, from Wednesday evening till Saturday morning, from $\frac{1}{6}$ to $\frac{1}{4}$ of a grain of morphia, and from $\frac{1}{80}$ to $\frac{1}{20}$ of a grain of atropia, were administered every third, fourth, or sixth hour, and the current was directed over the epigastrium and border of the ribs two and three times daily.

A most obstinate attack of hiccough is reported in a case of phthisis, where morphia, chloroform internally, morphia and atropia, strychnia, galvanisation of the phrenics and epigastric region, thirty-grain doses of bromide of potash, and one eightieth of a grain of strychnia every three hours, produced only transient relief; and at last, one drop of a one per cent. solution of nitro-glycerine was given every two hours at first, and later at longer intervals, producing a complete and total cessation of the symptom. In this case, which lasted eleven days, the hiccough had become almost constant, and was a source of great danger. Of course the remedy produced a considerable headache, but, judging from its good

effects in angina pectoris, it is not unreasonable to suppose that it may be of service in many severe cases of hiccough. For a similar reason I would suggest the use of liquor potassii arsenitis in one half drop or drop doses every hour for part of a day, and then every two or three hours. The addition to this of belladonna or atropia would, perhaps, produce better results in some cases than the Fowler's solution alone. I do not recollect to have seen the remedy mentioned in this connection, but believe it, or the above combination, worthy of trial.

Dr. George C. Kingsbury reported, in the British Medical Journal, a very severe case, lasting twelve days, which resisted all kinds of domestic measures, including vomiting, purging, blistering of the abdomen, bromide of potash, belladonna, camphor, acetic acid, chloroform, hydrocyanic acid, ammonia, morphia, pressure on the phrenic nerves and over the epigastrium, and large doses of morphia hypodermically. Thirty grains of hydrate of chloral were then administered in one dose. This produced six hours of sound sleep, and stopped the hiccough. The report states that he "has always found that a liberal administration of the drug produced prompt relief." It would seem that thirty grains of hydrate of chloral is a larger single dose than should be recommended.

Another correspondent of the same journal relates the history of a very severe case, lasting three months, and which resisted morphia hypodermically, quinine, extract of belladonna, tincture of valerian, mustard externally, dry cupping over the spine, chloroform, ether, zinc, bismuth, numerous emetics and purgatives, and was finally cured by the hypodermic injection of one half grain doses of pilocarpine.

Dr. William F. Hutchinson, of Providence, R. I., in a communication to the Medical Register, gives specific directions for the application of electricity for the cure of this annoying symptom. I quote them entire:

One pole of a Fleming induction coil is to be attached to a round sponge electrode, say one and a half inches in diameter, which is placed over the axillary plexus, firm pressure being made by bringing the arm down to the side and holding it there. Place the patient in a sitting

posture, stripped to the waist, and, using a large moistened sponge for the other pole, commence making slow stroking passes over the intercostal spaces on both sides extending around the trunk. The current should be mild at first, gradually increased in strength until the intercostal muscles plainly contract, unless the pain becomes too great to bear before that point is reached. Of course the room must be warm, and care taken to avoid a chill. In several cases where an erect posture was not an easy one to take or maintain, I have simply passed the current from one pole to the other around the trunk, but without much success. Galvanism has also received a fair essay, but the results were so incomparably inferior to those from the induced current, that it was abandoned.

These instructions, coming from a gentleman so capable of imparting them, must bear the impress of authority, and deserve a trial in obstinate cases, especially in hysterical and asthenic types, with the almost positive expectation of producing relief.

The hypodermic injection of the tincture of gelseminum is said to cure hiccough in cases characterized by the condition known as high arterial tension. From ten minims to one drachm, diluted with an equal amount of water, is given hypodermically. A correspondent states that he has never known it to fail in suitable cases, and has had considerable experience in its use. The injection is made at various places, the epigastric region being generally given the preference. Local abscesses occur in something less than five per cent. of the cases thus treated.

A physician who has been afflicted from boyhood with attacks of hiccough, coming every six or seven weeks and lasting the greater portion of a day, accidentally learned that chewing calamus root controlled the spasm for the time being. It does not possess any curative property, but simply stops it for the time.

A correspondent of the Therapeutic Gazette recommends the extract of hyoscyamus in pill form, and presents very gratifying reports of its results. Another contributor to the same journal reports complete success from the use of a decoction of the root of paeonia officinalis.

Hoffman's anodyne in teaspoonful doses, undiluted, and musk, are remedies frequently recommended as sure specifics. I have tested, personally, both remedies, and they both failed. It must be admitted that, possibly, a good deal of our Hoffman's anodyne is not genuine, on account of the expensiveness of ethereal oil, and consequently an omission of that article in its composition. Such being the case, a failure from its use for the relief of hiccough, or any spasmodic affection, would be anticipated.

In cases accompanied by an acid fermentation of the stomach and over production of gases, the diet requires careful supervision.

A blister over the course of the superior laryngeal nerve, and stimulation of the phrenics by electricity, one pole being applied over a phrenic nerve in the neck and the other over the diaphragm, and pressure over the trunk of the phrenic nerve by means of the finger over the scalenus anticus muscle, have each proved serviceable in some cases.

The application of wet packs, or the Paquelin cautery over the cervical portion of the spine, has relieved some severe cases of a hysterical type.

The production of violent emesis will control some cases, but it frequently fails.

A somewhat voluminous writer in one of the journals says that no remedy equals ipecac, in non-emetic doses, for hiccough.

Stillé records the history of a case where it seemed that a fatal termination would certainly ensue unless the symptom was controlled, and, having exhausted many remedies without relief, finally stopped it with quinine.

Vinegar, as was pointed out by Underwood over half a century ago, calomel, aromatic spirits of ammonia, nux-vomica, dilute sulphuric acid, eucalyptus globulus, nitrite of amyl, acetic acid, oil of amber, various kinds of counter-irritation, holding the breath as long as possible, and the exercise of will power, have each received the credit of curing hiccough.

DIPHTHERITIC PARALYSIS.

By J. Lewis Smith, M. D., of New York County.

October 9, 1888.

Writers in medicine prior to the sixteenth century were either ignorant of diphtheritic paralysis, or they vaguely alluded to it when they described the extreme debility which sometimes accompanies or follows diphtheria. No clear and certain reference to it has been discovered in medical literature until near the close of the sixteenth century. According to Sanné, Nicholas Lepois alluded to it in 1580, and Miguel Heredia in 1690. Ghisi, in a letter describing the epidemic which occurred in Cremona, on the north bank of the river Po, in 1747–'48, writes of his own son, who had paralysis in a severe form following diphtheria,—"I left to nature the cure of the strange consequences which had been remarked in many who had already recovered, and which had continued for about a month after recovery from the sore throat and abscess. During this period the child spoke through the nose; and food, particularly that which was least solid, returned through the nares, in place of passing down the gullet."

In France, also, diphtheritic paralysis began to attract attention at or about the time when Ghisi in Italy wrote the above.

Chomel, in 1748, described two cases, following what he designates gangrenous sore throat. The first patient, he says, did not entirely begin to convalesce until the forty-fifth day of the disease, having difficulty in articulating, speaking through the nose, and his uvula was pendulous. "In the second case, the patient became squint-eyed and deformed; but day by day, as his strength returned, he regained his natural appearance."

In America, in 1771, Dr. Samuel Bard, of New York, also related a case of this form of paralysis. A girl of two and a

half years had recovered from a diphtheritic sore throat, and a diphtheritic pseudo-membrane upon the skin, following the application of a blister, had disappeared, when her convalescence was retarded by paralytic symptoms. "Whenever," says Bard, "she attempted to drink, she was seized with a fit of coughing, yet she was able to swallow solid food without any difficulty." She improved, but in the second month she could scarcely walk, "or raise her voice above a whisper."

From the time of Chomel, Ghisi, and Bard, more than half a century elapsed, during which diphtheritic paralysis attracted little attention, though Jurine and Albers alluded to it in 1809. It cannot be doubted that cases occurred in this long period wherever diphtheria prevailed, but it might have been of such a type that paralysis was infrequent, for Bretonneau, although he was familiar with Ghisi's and Bard's writings, did not recollect that he had seen a case of diphtheritic paralysis prior to 1843. Although a close observer of diphtheria, the paralysis had not been observed by him, or, at least, had not attracted his attention until it occurred in the person of his townsman, Dr. Turpin, of Tours, in 1843. Twelve years subsequently, in 1855, Bretonneau had made a sufficient number of observations to convince him that diphtheria frequently gave rise to a peculiar form of paralysis; and in his writings of this year he drew the attention of physicians to this fact. But the opinion expressed by the renowned physician of Tours did not gain general acceptance until his friend and admirer, Trousseau, at first distrustful of the existence of such a paralysis, had made a series of observations which fully established, in his mind, the theory of Bretonneau. His remarks on this subject, published in his Treatise on Clinical Medicine, are interesting as showing how gradually important truths are revealed in medicine. He had seen, as far back as 1833, a marked case in the service of Récamier in Hotel Dieu, and another equally severe and typical case in 1846; but it was a long time before he recognised this ailment as one of the results of the diphtheritic poison. Says he, alluding to the cases seen in 1833 and 1846, they were "a dead

letter to me, yet I was acquainted with the case described by Dr. Turpin, of Tours. Bretonneau related it to me, and said that it was a case of diphtheritic paralysis. The statement seemed to me incredible. I refused to see anything more in the case than a coincidence. . . . It was not till about the year 1852, that, enlightened by new cases, better studied and better interpreted, I understood diphtheritic paralysis as Bretonneau understood it. From this time, whenever an opportunity occurred, I, in my turn, called the attention of my colleagues to this important subject."

The clinical teachings and observations of Bretonneau and Trousseau were widely read, and the profession throughout the world soon recognised the fact that diphtheria often gives rise to a form of paralysis, if not peculiar to it, yet rare in other infectious diseases. Since these observations of Trousseau, many monographs on diphtheritic paralyses have been written by such men as Roger, Germain Seé, Herman Weber, Charcot and Vulpian, Gubler, Landouzy, Suss, H. V. Ziemssen, A. Jacobi, and W. H. Thomson; and many observations throwing light upon it have been made. But the nature of this paralysis, and the manner in which it occurs, are still undetermined. The fact that there is such a paralysis was slow in gaining acceptance in the minds of physicians; and so the cause and pathology of the paralysis are still not fully ascertained.

Clinical History. The statistics of different writers vary in regard to the frequency of diphtheritic paralysis. Probably it is different in different epidemics, and some observers may overlook the milder cases, which soon recover, and which are indicated by a slight impediment in swallowing, and a slight nasal intonation of the voice. We may accept as approximating the truth, with regard to its frequency, the following statistics of well known and painstaking clinical instructors, who would be likely to detect the mildest forms of paralysis: In 937 diphtheritic cases observed by Cadet de Gassicourt, paralysis occurred in 128. Sixteen and six tenths per cent. of Roger's cases of diphtheria had paralysis, and eleven per cent. of Sanné's cases.

But it must be borne in mind that, since the paralysis is in most instances post-diphtheritic, those severe cases which are speedily fatal from blood-poisoning or croup do not live long enough to suffer from it, and such cases would be more likely to have the paralysis if they lived than the milder cases which recover. Hence it has been estimated that if all diphtheritic patients lived sufficiently long, one in every four, or even one in every three, would exhibit paralytic symptoms.

Time of Commencement. In most instances the paralysis does not begin until the period of apparent convalescence from diphtheria, when the pseudo-membrane has nearly or quite disappeared. Sanné says it most frequently appears from eight to fifteen days after recovery, the limit perhaps extending to thirty days; but it may appear from the fifth to the eleventh day, and even as early as the second or third day from the commencement of diphtheria. Cadet de Gassicourt states that in twenty of his cases the paralysis began before the disappearance of the pseudo-membrane, most frequently about the seventh or eighth day from the beginning of diphtheria. In two it commenced on the third day, and once in a prolonged diphtheria it began as late as the thirty-fifth day, the pseudo-membrane still being present. Usually, according to my observations, when paralysis follows diphtheria, the nasal voice and some impediment in swallowing are observed early in the stage of convalescence, and at a later period muscles remote from the fauces may or may not be affected. Thus Dr. L. E. Holt exhibited to the New York Clinical Society, in December, 1887 (N. Y. Med. Jour., Dec., 1887), a child of two years, who had diphtheria in August, and a second attack in the middle of October. She convalesced slowly, and in her convalescence had no paralytic symptoms, except a nasal voice, until December 1, when multiple paralysis suddenly developed. A brother of this patient also had diphtheria in October, moderately severe, and early in convalescence paralysis of the muscles of the palate began, followed by that of other muscles; but it was not until the middle of December that the lower extremities were paralysed.

These cases are examples of the usual mode of commencement and extension of the paralysis.

The paralysis of diphtheria is, therefore, with few exceptions, a late symptom of diphtheria, or a sequel; but Dr. Boissarie (Gaz. Hebdomadaire, 1881) has related cases in which the paralysis was not preceded by the ordinary symptoms of diphtheria, and which, as far as I am aware, are unique. An officer in the police had been ailing two or three days: he had a nasal voice, and drinks returned through the nose. On inspection, the velum palati was found insensible and motionless, but the fauces were otherwise in their normal state. In the hospital alongside the barracks in which the above case occurred, a young man, without fever, redness, or swelling of the fauces, had also a nasal voice, and return of liquid food through the nose. The porter of the hospital was similarly affected, and the doctor stated that certain other patients, in like manner, presented symptoms of paralysis without the history of an antecedent diphtheria. Dr. Reynaud, called in consultation, expressed the opinion that the paralysis had a diphtheritic origin; and this opinion was strengthened by the occurrence, immediately afterward, of an epidemic of diphtheria. It appeared as if the diphtheritic poison had affected the muscles of the palate without manifesting its action in any other part of the system. Certainly such unusual cases should have been more minutely detailed. It is remarkable, inasmuch as diphtheria is so widely spread and so closely studied, that, if paralysis is sometimes the only manifestation of the operation of the diphtheritic poison, other similar cases have not been observed and reported. It is possible that, in the above cases, diphtheria had occurred of so mild a form that it escaped notice.

I have elsewhere related a case in which diphtheritic albuminuria was preceded by diphtheria of so mild a form, as regards the usual manifestations, that it nearly escaped detection, and yet the renal complication or sequel was so severe that death resulted. In another instance a little girl, not complaining of herself, left a call for a visit to her brother, whom I

found with diphtheria of a rather severe type. At the time of my visit she was playing with other children in the street, and it occurred to me to call her in and examine her throat. To the surprise of the family the characteristic diphtheritic patch was observed over one tonsil. Such mild walking cases are not infrequent in New York city, where diphtheria, established for many years, is constantly present, sometimes pernicious and speedily fatal, but in other instances of an extremely mild type, and with no evidence of blood-poisoning. All physicians who have had much experience with diphtheria, in localities where it is naturalised or endemic, can recall cases in which a sequel of diphtheria, as paralysis or albuminuria, has led to an accurate diagnosis of a preëxisting throat affection, which was so mild or trivial that its true nature was not suspected. In this respect diphtheria resembles scarlet fever, which also presents an equally variable type, from extreme mildness to a fatal severity. Hence it seems not improbable that in Boissarie's cases diphtheria of so mild a form that it escaped notice had preceded the paralytic manifestations.

The paralysis, as a rule, affects both motor and sensory nerves. Thus, in paralysis of the velum and pharynx, anaesthesia, more or less marked, occurs in the velum, the isthmus of the fauces, and the walls of the pharynx, in addition to the motor paralysis. In the more severe cases, anaesthesia, with absence of reflex action, occurs not only over the entire pharynx, but also over the epiglottis and glottis. The combination of motor and sensory paralysis should be borne in mind in studying the cause and nature of the ailment. The muscles affected by diphtheritic paralysis undergo atrophy as in other forms of paralysis. Dr. H. V. Ziemssen (Clinische Vorträge, 1887, No. IV) says that such marked atrophy does not occur in any other disease, except in acute polio-myelitis and saturnine paralysis.

The symptoms and course of diphtheritic paralysis vary according to its location and the muscles affected. Therefore we will sketch the clinical history of its various forms sepa-

rately, beginning with that which is first in time, most frequent, and least dangerous.

1. *Loss of the Tendon Reflexes.* In 1882 Dr. Buzzard made the observation that the knee-jerk is absent in cases of diphtheritic paralysis. Bernhard (Virchow's Archiv. Bd. 99) stated that loss of knee-jerk may precede other nervous symptoms, or may occur without other symptoms indicating impairment of the nervous system. He also stated a fact now generally admitted, that the loss of knee-jerk may have diagnostic value in indicating the diphtheritic nature of a preexisting obscure disease. But the profession in this country had little knowledge of the loss of the tendon reflexes in diphtheria until Dr. R. L. McDonnell, of the Montreal General Hospital, read a paper on this subject before the Canada Medical Association, August 31, 1887 (published in the Medical News of Philadelphia in the following October). Dr. McDonnell's observations relate to eighteen cases of diphtheria admitted into the General Hospital. Of these eighteen patients, ten had loss of knee-jerk at the time of admission, while in the remaining eight it was present. The cases observed by the doctor were sufficient, he believed, to enable him to make the following statement: "Knee-jerk, in many cases of diphtheria, is absent from the very first day of the illness." It is a noteworthy fact that in most of the cases detailed by McDonnell, in which there was loss of the tendon reflex, other forms of paralysis subsequently appeared.

Since the publication of Dr. McDonnell's paper, many observations have been made confirmatory of his. At a meeting of the New York Clinical Society, December 23, 1887, Dr. L. E. Holt exhibited a brother and sister, of five and two years, with multiple paralysis, who had completely lost the knee-jerk; and the examination of one of them showed complete loss of the plantar reflex. Since the attention of the profession has been directed to the loss of the tendon reflexes, all observers admit that it is not only the earliest, but the most frequent, of the paralytic symptoms, probably occurring in one third to one half of all cases under treatment. Dr.

Angel Money, in a discussion before the London Clinical Society, September, 1857, stated that he had observed an initial increase of the knee-jerk preceding its abolition. Dr. H. V. Ziemssen remarks, that, while the tendon reflexes are so often lost, the cutaneous reflexes are frequently exaggerated.

The loss of the tendon reflexes, while, as has been stated, it is the first in time of the paralytic symptoms, appears also to have the longest duration. In cases of multiple paralysis it appears to be the last to disappear. Thus, Dr. McDonnell states that the loss of knee-jerk in a boy of fourteen years continued four months, and in his two sisters it was still present when all other symptoms of the disease had disappeared.

2. *Palatal Paralysis.* With the exception of the loss of the tendon reflexes, the most common form of diphtheritic paralysis is that in which the velum palati and muscles of the pharynx are affected. This form of paralysis is revealed by a nasal intonation of the voice, slow speech, snoring during sleep, difficult deglutition, and return of liquids through the nares. As the paralysis increases in severity and extent, the palato-glossus and constrictor muscles of the pharynx lose their functional activity, the difficulty in swallowing increases; the patient finds it necessary to throw his head backward, and swallow slowly and in small amount. The food descends in the oesophagus by its weight, and with but little aid from the pharyngeal muscles. On examining the fauces, we discover the velum relaxed and motionless, and the uvula, deprived of its tonicity, drops on the base of the tongue. On touching the uvula with the point of a pen or pencil, it is found to be insensible, no reflex action occurring. Sensory paralysis is present, as a rule, in typical cases, the patient experiencing no pain when the parts are pricked with a pen or other instrument. The fauces should be inspected and tested from day to day in order to determine the progress of the paralysis. In mild cases it may be limited to the velum and palate, but it frequently extends to the epiglottis and upper part of the larynx, so that, in attempts to swallow, portions of the food enter the larynx, exciting a cough. The affected muscles

may regain their use in less than a week, but frequently from one to two months elapse before their function is restored.

Palatal paralysis terminates favorably, with few exceptions, if the patients are otherwise in good condition; but if there be much prostration from the antecedent diphtheria and from the dysphagia, death may occur from inanition. Cadet de Gassicourt has cited two cases of death from this cause, although life was probably prolonged by feeding through an oesophageal tube, introduced through the nostrils. Rarely, also, death has occurred from the descent of food into the air passages, and the plugging of a bronchus. Tardieu and Peter have each related a case of this mode of death. As a chief function of the velum palati is to close the posterior nares during deglutition, food, especially if liquid, is liable to be returned through the nostrils until the function of the velum is restored.

3. *Multiple Paralysis.* This form of paralysis is commonly preceded by loss of the tendon reflexes. In most instances it begins with loss of power in the muscles of the palate; but exceptions occur. Cases are reported in which the muscles of the eye, those of motion and of accommodation, are first paralysed, the palatal muscles being unaffected or subsequently attacked. Trousseau has stated that in cutaneous diphtheria the first loss of muscular power is sometimes in the lower extremities instead of the palate; and other observers have recorded cases in which multiple paralysis commenced in one or more of the extremities. Therefore the order of the paralytic seizures varies in different cases, and muscles are affected in one patient that escape in another. The degree of paralysis varies in different muscles. In some the loss of power is complete, while in others it is partial. While the lower extremities are entirely motionless, the patient frequently has considerable use of the upper extremities.

Even in the severest cases many groups of muscles entirely escape. Therefore I prefer the term multiple paralysis to the term general paralysis, employed by some writers to describe this form of the disease. Trousseau speaks of what he

designates the mutability of diphtheritic paralysis. He says the paralysis which occupies one limb disappears from this limb to manifest itself in another. "The numbness, for example, which the patient has been experiencing in one leg, will suddenly cease, and become greater in the other leg. To-day the right hand will not give a dynamometric pressure of more than ten or twelve kilogrammes, and to-morrow its power will have augmented, while that of the left will have diminished. Then the parts which were first affected are a second time attacked, and become more affected." Even the dysphagia may vary on different days, as Cadet de Gassicourt has stated. He relates the case of a child of three and a half years, in whom the velum palati suddenly resumed its function; the head, which had dropped from paralysis of the muscles of the neck, became erect, the patient was able to sit, and the upper extremities recovered their power; but the improvement was of short duration, the paralysis returning as at first. These sudden and unexplained variations in the degree of paralysis, resemble, says Trousseau, the mutability of paralysis in hysteria.

Among the most noteworthy of the paralyses resulting from diphtheria are those pertaining to the eye. The media and retina are unaffected, but the levator palpebrae, the muscles of accommodation, and the motor muscles of the eye are paralysed in certain patients so as to cause dropping of the eyelids, strabismus, and indistinct vision. In addition to the muscles already mentioned, various muscles of the trunk, of the neck, the sphincter ani, and sphincter vesicae are sometimes paralysed, producing deformity and incontinence of urine and faeces. The paralysis of the muscles of accommodation is usually such that patients become presbyopic, seeing distinctly distant, but not near, objects.

The muscles of the face are also occasionally paralysed. Many observers have related cases of facial hemiplegia. When general paralysis of the facial muscles occurs (fortunately a rare event), whatever the mental state, however great the excitement, the features are entirely devoid of ex-

pression; the aspect is dull and idiotic; the face is flabby and motionless; the lids and lips droop; saliva flows from the mouth; and speech is slow and difficult. At the same time the mental faculties, deprived of the usual mode of expression in the features, are sound and active.

But the most accurate idea of the symptoms of multiple paralysis can be imparted by the narration of a case, and I select for this purpose the graphic description of this form of paralysis published by Dr. C. W. Fallis in the Medical Summary for January, 1888. He describes the ailment as it occurred in his own person, as follows:

About three weeks after the subsidence of the disease (diphtheria), the paralytic symptoms began to show themselves. Impaired vision was the first trouble noticed,—inability to accommodate the eyes to near objects; and, in taking up a paper to read, one morning, I found that I could scarcely see a word; and soon after, although distant objects could be seen as well as ever, high-power glasses were used to read any kind of print. Double vision was noticed afterward. At about the same time numbness of the tongue was felt, the muscles of deglutition became paralysed so that swallowing was attended with strangling and regurgitation of food through the nose. There was a rapid pulse, 120 to the minute, showing that the pneumogastric was involved. Weakness of the limbs, causing a staggering gait, appeared; fingers became weak and numb, so that small objects could not be picked up, the symptoms becoming worse and worse as the disease progressed. The muscles of the left side of the face became affected with all the symptoms of facial paralysis from organic disease. Motion became more and more impaired, till I could neither stand nor walk, and when at the worst I was perfectly helpless; could not feed myself; had to be lifted from chair to chair, turned in bed, and could not even lift my hand to my head, or throw one limb over the other. Sensation was so impaired that hands and feet felt like lifeless weights, and in the dark I could not tell whether my feet were on the floor or not. The muscles of respiration were at no time affected to such an extent as to render breathing difficult, and the power of perfect speech was retained. Paralysis of the bowels necessitated the use of warm water injections to promote their action. Some of the symptoms abated, while others became more aggravated, those first to appear being generally the first to subside. However, the smaller sized muscles recovered rapidly, while the large fleshy ones were more tardy in reaching their normal state, the facial paralysis lasting but a few days, while locomotion was either labored or impossible for many weeks. The course of the disease, from

the beginning to the worst stage, was about nine weeks, when it remained stationary for two weeks. Improvement was at first very slow and tedious, but after I could walk a little, it was much more rapid; and by the fifteenth week, with the exception of some weakness, I was well.

Multiple paralysis not infrequently continues from two to six months. As might be expected, the prognosis is less favorable when the paralysis is multiple than when it is limited to the velum and pharynx. In thirteen cases observed by Cadet de Gassicourt, six died.

4. *Cardiac Paralysis*,—the cardio-pulmonary paralysis of certain French writers. In cases of the first, second, and third forms of paralysis, which have been considered above, the vital organs are not directly involved. These paralyses, however inconvenient they may be, are not directly fatal. The paralysis which we are about to consider presents a very different clinical aspect, inasmuch as the organs affected are among the most important in the system, a serious impairment of their functions rendering death inevitable. Physicians who have had experience in the treatment of diphtheria have met cases in which symptoms, usually of sudden development, indicated dangerous heart-failure. In most cases of this kind, death speedily occurs, even when the attending physicians a few hours previously had made a favorable prognosis. Perhaps the patient has been gradually improving, the pseudo-membrane has nearly or quite disappeared, the temperature is not far from normal, the swallowing is better, and more nutriment is taken; the family are cheerful in the prospect of a speedy recovery, and the physician expects soon to discharge the patient, cured. Suddenly the scene changes;—the pulse becomes feeble and abnormally slow or rapid—it is usually at first slow, and subsequently rapid; the respiration is superficial; and the surface becomes pallid, perhaps slightly cyanotic. In the more favorable of these cases the patient may rally by active stimulation, and perhaps he eventually recovers; or, after some hours or a day or two of comparative comfort, he succumbs to a return of heart-failure. There is no other disease in which these sudden, unforeseen, and fatal

attacks of heart-failure occur so frequently as in diphtheria. There is no other disease in which physicians are so frequently deceived in their prognosis, for various reasons, but largely on account of the occurrence of these unexpected attacks of heart weakness.

But a clear and accurate idea of the clinical history of these sudden cases of heart-failure can be best imparted by the relation of typical cases. For this purpose I will briefly narrate cases occurring in the hospital service of one of the most trustworthy clinical teachers of the present time, M. Cadet de Gassicourt, though I believe that New York physicians, who have been several years in practice, can recall to mind cases equally severe and typical. I select his cases on account of the completeness of his records.

A child of two years entered his service on January 3d, with diphtheritic pharyngitis of ten days' continuance. The tonsils were large, still covered with pseudo-membrane, and the submaxillary glands were also enlarged. He had no laryngeal symptoms, and his urine was without albumen. On the following day the velum and pharyngeal muscles were slightly paralysed, the speech nasal, and deglutition moderately embarrassed. He was quiet during the night of January 4th and in the morning of the 5th, but at 10 A. M. he became chilly, his face and extremities feebly cyanotic, and slight dyspnoea and dilatation of the alae nasi were observed. His pulse, at first abnormally slow, became rapid; he was agitated, groaned, and fell into a state of prostration. Suddenly, at 11 o'clock, he was violently agitated, uttered loud screams of distress, and fell back, cyanotic and dead. The death struggle did not occupy more than one minute.

Another infant, also two years of age, entered the service, having diphtheritic pharyngitis of two days' continuance. The fauces presented the usual red appearance, the tonsils were swollen and covered with a thick exudate; but there was no albuminuria or croupiness. Two days later the pseudo-membrane had diminished, but the velum palati was paralysed. On the following day the general appearance was satisfactory, and the pseudo-membrane had still farther diminished. At 8 P. M. the infant was suddenly seized with vomiting, accompanied by great dyspnoea, rapid pulse (160), and a cyanotic hue of the face and extremities. He was restless, and uttered cries of distress. Two hours later he screamed loudly, raised himself in his couch, and fell back, dead.

A child of five years was admitted with diphtheritic pharyngitis of two days' continuance, having enlarged tonsils covered with pseudo-membrane

and enlarged cervical glands, but without cough or albuminuria. Seven days later, the ninth of the disease, the pseudo-membrane had disappeared, but the velum palati was paralysed. On the following day there was little change, except occasional vomiting; but the general state was good, and sleep tranquil. At 7 A. M. on the subsequent day, the eleventh of the disease, after a calm night, the child uttered two or three cries, the pulse became rapid, the respiration embarrassed, the features, extremities, and, finally, the entire surface cyanotic, and at 8 A. M. death occurred quietly.

The similarity of these three cases, occurring within a few days of each other, is apparent. Paralysis of the velum and palate had continued in the first case eighteen hours, in the second case thirty-six hours, and in the third case forty-eight hours, when suddenly the heart and lungs were greatly embarrassed in their functions, and death occurred within one hour from the commencement of the severe symptoms. The agitation, repeated cries of distress, and the shrill cry that preceded death, indicated extreme suffering. Severe pain, praecordial, epigastric, or abdominal, is present in some, if not most, of these cases of sudden heart-failure, as we shall see from cases presently to be related. It was probably experienced by these three patients, who were too young to express clearly their subjective symptoms.

Gombault made a minute microscopic examination of the affected organs in these three cases after the tissues had been properly hardened by chemical agents. In one of these cases he examined the pneumogastrics and myocardium, and both were found in their normal state. As regards the nervous centres, the anatomical changes were alike in all three. In the spinal cord, lesions were found at the origin of the anterior roots of the spinal nerves, characterized by fragmentation of the medullary substance in the nerve fibres, numerous granules and minute globules appearing in this substance and occupying its place. In addition to this, undue swelling of the axis cylinders was observed. In the three cases the gray substance in the anterior cornua had undergone a sort of rarefaction, the microscopic sections being more transparent and the elements in sections being wider apart than in the normal

state. No meningitis nor injury of the blood-vessels was observed in the spinal columns, but numerous nerve cells were deprived of their prolongations. The medulla oblongata, the centre and source of the nervous supply to the heart, lungs, and stomach, through the pneumogastrics, was also carefully examined. Nothing abnormal was observed in this organ except small masses of leucocytes in the vessels. The substance of the medulla oblongata, and the nerve fibres constituting the roots of the pneumogastrics, seemed healthy. The small masses of leucocytes in the blood-vessels were not sufficient to obstruct the circulation, and the appearance of the corpuscles was normal. Hence, in the opinion of Gombault, the small aggregations of leucocytes in the vessels had no affect on the innervation of the thoracic organs derived from the medulla. The points of special interest in the microscopic examinations of the three cases were the apparently healthy and normal state of the pneumogastrics and myocardium in the one case in which they were examined, and of the medulla oblongata in the three cases, while the gray matter of the spinal cord, which had no immediate nerve connection with the heart, showed marked degenerative changes. The above are striking examples of sudden and fatal heart-failure occurring during apparent convalescence, when the symptoms of diphtheria, with the exception of the paralysis of the velum and palate, appeared to be abating. The following cases presented a clinical history in some respects different:

A child of eight years had been under treatment for diphtheria since February 9, 1883. On the 20th the membrane had disappeared, but slight paralysis of the velum and left upper extremity was observed, and the urine contained a little albumen. At 3 P. M. she was seized with severe abdominal pains, followed by vomiting, slow respiration, and slow and feeble but regular heart-beat, imperceptible pulse, coolness of surface, and cyanosis. These symptoms increased, and at 6½ P. M. death occurred. The clinical history differed from that in the three cases related above, in the fact that there was no agitation nor moaning at the close of life, and that the heart-beat was abnormally slow unless during the last moments.

In another case paralysis of the velum and palate began on the third day of diphtheria while the pharyngeal and nasal inflammations were in full activity. The urine was slightly albuminous. Three days subsequently, in the morning, the muscles of the nucha and right shoulder were paralysed. At 2 P. M. the child complained of violent abdominal pains, followed by nausea and vomiting. The vomiting was partially relieved, but the action of the heart became rapid, and slow asphyxia followed, attended by a cyanotic hue, which gradually increased to the extremities; and death occurred after these symptoms of heart-failure had continued three hours.

A boy of five years had diphtheritic croup, for which tracheotomy was performed, and the cannula inserted. He subsequently did well for a time, but afterward lost his appetite. On the eleventh day of the disease he had paralysis of the velum and palate. On the twelfth and thirteenth days the disease appeared stationary, and the child was calm. Suddenly, at 7 o'clock on the evening of the thirteenth day, a multiple paralysis developed. Liquid food, taken by the mouth, was returned in part through the nostrils, and in part entered the larynx and escaped from the tracheal opening. An hour later the muscles of the nucha, the arms, and both sides of the trunk were paralysed, and the head dropped. At 7 A. M. on the following day, vomiting, dyspnoea, exceedingly rapid pulse, and cyanosis of the face and extremities occurred; the asphyxia increased, the pulse grew feeble, the surface cool, and death occurred three hours later.

Cases like the above are not infrequent in severe epidemics of diphtheria, but in some cases the loss of power in the heart occurs more gradually.

A boy of twelve years had diphtheritic pharyngitis, from which he was apparently convalescing. Some days after the disappearance of the inflammation the velum palati and pharynx were paralysed. Then succeeded paralysis of the nucha, of the muscles of accommodation, and the muscles of the inferior and superior extremities. During three weeks the march of the paralysis was progressive. Then for a time it seemed to recede, but the improvement did not continue. One month from the commencement of diphtheria, the child uttered plaintive cries, became motionless as if from general paralysis, and a state of asphyxia slowly occurred, accompanied by slight cyanosis. During the following night, the patient lay in a stupor, and on the following morning the features presented a cadaverous and slightly cyanotic hue; the extremities were cool and blue; the tongue pallid, moist, and of normal warmth; the respiration hurried and without auscultatory signs of disease; the pulse feeble and rapid (148). Finally the sphincters were paralysed, the urine and

faeces escaping involuntarily. Within ten minutes after the above notes were written, the patient died of heart-failure. The feature of special interest in the case was the long continuance of multiple paralysis before the cardiac and pulmonary symptoms occurred.

Sudden heart-failure in diphtheria is usually fatal, but recovery is possible. Cadet de Gassicourt, in his large clinical experience, met one recovery to fourteen deaths. This case is interesting, since the heart-failure preceded the palatal and other forms of paralysis instead of being preceded by them, as is ordinarily the case. Twenty days after the commencement of diphtheria, and when in apparent convalescence, the patient was seized with extreme pain in the praecordial region, attended by a fall of pulse to 42, cold sweats, rigors, and vomiting. In one and a half hours these symptoms abated. Three days subsequently another similar attack occurred, and afterward two others, but less severe than the first. On the twenty-eighth day from the beginning of diphtheria, and eight days subsequently to the first attack of heart-failure, paralysis of the palate and velum began, soon followed by that of the vocal cords, muscles of accommodation, and of the extremities, which continued three months, when recovery was complete. Cases of recovery have also been related by Sanné, Billard, and others.

What is the cause of this sudden loss of power in the heart in diphtheria, occurring usually during apparent convalescence? Does it result from disease in the muscular stricture of the heart, from thrombosis, or from ante-mortem clots in the cavities of the heart?—or does it result from disease in the central organ of innervation, the medulla oblongata, or from disease and deficient conducting power in the important nerve which controls the heart's action, the pneumogastric, or in the branches which this nerve supplies to the heart as well as to the lungs and stomach?—for these three organs appear in most instances to be affected simultaneously.

Bouchut and Lagrave have attributed sudden heart-failure in diphtheria to a vegetative endocarditis; and yet in the

large majority of cases no *bruit* nor heart signs have occurred during life to lead the physician to suspect the presence of this disease. The belief in the occurrence of an endocarditis is based on the appearance of the free edge of the mitral valve, and sometimes, also, of the aortic valves. They have appeared roughened, as if from the presence of minute vegetations. At the same time the surface of the valves and the endocardial surface have undergone no appreciable change, such as endocarditis would be likely to cause. Since the announcement of the theory of Bouchut and Lagrave, attention having been drawn to the subject, the roughened edges of the mitral and aortic valves, upon which this theory of an endocarditis as a causative agent of sudden heart-failure is based, have been found with equal frequency in children who have perished with other diseases. The late Prof. Parrot, says Cadet de Gassicourt, expressed the decided conviction that the roughening of the tips of these valves does not have an inflammatory origin, but is an anatomical peculiarity which originates in the foetal development. Sanné says, in reference to Bouchut's and Lagrave's theory,—"My personal investigations are absolutely negative. Observations of diphtheria to the number of 149, taken in these later years, . . . have not furnished a single case of endocarditis. I should fear to express myself in such a positive manner if I should trust to the single testimony of my senses, but a large number of the patients were auscultated by Berthez and by D'Espine and Gombault. . . . The conclusion . . . therefore is, that diphtheritic endocarditis is extremely rare, as pathological anatomy and clinical observation alike demonstrate." Therefore the theory which attributes sudden heart-failure to endocarditis has not been sustained by recent observations, and does not appear to be tenable.

Weakening of the heart's action in diphtheria, and sudden death as a consequence, have, with more probability, been attributed to granulo-fatty degeneration in the muscular fibres of the heart, consequent upon a prolonged and severe diphtheritic attack. Oertel says,—"When the general dis-

ease lasts long, and is very intense, and especially in cases in which death is caused suddenly by paralysis of the heart, the muscle appears pale, soft, friable, broken by extravasations of blood, and on microscopical examination most of its fibres are seen to be already in an advanced stage of fatty degeneration."[1] Such degenerative change, if occurring in a considerable proportion of the muscular fibres of the heart, would inevitably render the contractile power of this organ feeble, and perhaps inadequate. Still, if we regard it as a cause of heart-failure, it can be considered as such in only a relatively small number of cases, for in most instances the weakening of the power of the heart is sudden and during convalescence; at a period, therefore, when degenerative changes are not likely to occur. In most of the recorded cases the contractile power of the heart does not appear to have been notably weakened previously to the attack of heart-failure, as it would probably have been were degenerative changes in the myocardium the sole or chief cause. The clinical history is as if the heart were suddenly overpowered by an agent of rapid, never slow, development. Moreover, in typical cases of sudden heart-failure the microscope sometimes reveals a healthy myocardium, as in one of the cases related above. We must look, therefore, for some other cause, although admitting that degenerative changes in the muscular fibres of the heart contribute to a weakened action of this organ.

Sudden heart-failure in diphtheria has also been attributed to cardiac thrombosis, but, as several writers have pointed out, clots exactly identical occur in the heart in those who die suddenly from other causes than diphtheria, and there is every reason for the belief that they occur during the death struggle, and are not the primary cause of the heart-failure.

Among the most strenuous advocates of the theory that cardiac thrombosis is the common cause of sudden heart-failure and sudden death in diphtheria is Beverley Robinson, of New York, whose able thesis on this subject, published in

[1] Ziemssen's Cyclopoedia, vol. 1.

1871, when he was a resident of Paris, attracted much attention, and is alluded to by nearly all recent French writers on this subject. But the opinion of most pathologists, in reference to this theory, is, I think, expressed by Cadet de Gassicourt in the following passages, published in his clinical treatise: "I have often shown you these clots, and I have enabled you to see that they occur equally in children who have died of diphtheria, as well as in those who have succumbed to other maladies; in subjects who have died suddenly, and in those who have not been attacked by any sudden casualty. This objection is in itself conclusive. You have been able to see, also, that the constitution of these clots does not have any of the characters which authors, the most competent, have assigned to clots formed during life: they are the clots of the agony." Sanné, also, writes in almost identical language.

In searching for the cause of sudden heart-failure in diphtheria, we must note the fact that, as a rule, in typical cases it is preceded by palatal and often multiple paralysis. The paralysis has continued for a time, extending, perhaps, from one group of muscles to another, when suddenly the heart passes under some powerful influence which restricts and overpowers its action. The theory of a deficient innervation, or a true cardiac paralysis, appears most tenable under the circumstances. It affords the most satisfactory explanation of those fortunately infrequent cases in which death suddenly occurs during apparent convalescence from diphtheria, when the symptoms are fast disappearing, with the exception of the palatal or other paralysis. It affords—best of all the theories—an explanation of the occurrence of sudden death from heart weakness in those obscure cases which have puzzled physicians, cases in which the post-mortem examination has revealed an apparently healthy state of the heart.

The theory of an arrested or deficient innervation of the heart furnishes an explanation of the occurrence of concomitant symptoms in these cases of sudden heart-failure,—such

symptoms as vomiting, epigastric pain, and dyspnoea, or irregular respiration; for the heart derives its innervation from the same source as the lungs and stomach, that is, through the pneumogastrics. For the reasons now given, we feel justified, in our classification of the forms of diphtheritic paralysis, to make a distinct class having the designation cardiac paralysis, or, to adopt in our language the French expression cardio—pulmonary paralysis.

Aetiology.—The four forms of diphtheritic paralysis—first, the abolition of the tendon reflexes, the most common, the earliest, and least dangerous of all; secondly, palatal paralysis, which may occur as early as the third day of diphtheria, but is most common during its later stages, or in the period of convalescence; thirdly, multiple paralysis, in which various muscles throughout the system are paralysed; and, fourthly, cardiac paralysis, the most dangerous of all—are probably produced by the same cause, and have the same pathology in most instances. We may, therefore, in the following pages, in studying the cause and nature of diphtheritic paralysis, regard the various forms which it exhibits as manifestations of one disease. What is true of cardiac paralysis, as regards its cause and nature, we may assume to be true in reference to palatal and multiple paralysis, and even to the abolition of the tendon reflexes.

The most dangerous and fatal paralysis, the cardiac, is, as we have stated above, in nearly all patients associated with the milder forms, showing that the same cause or causes are operative at the same time in the individual. Gubler, in his memoir published in 1860–'61, attributed paralysis of the velum and palate to disease of the terminal nerves, produced by contiguity or propagation from the inflamed fauces; and he held that the same injury of the nerves and paralysis might result from any anginose inflammation if severe enough. But this theory was short-lived, for physicians soon perceived that it was inadequate to explain the occurrence of paralysis at a distance from the inflamed surfaces; and palatal paralysis sometimes occurs after cutaneous and other

forms of diphtheritic inflammation, in which both the fauces and nares entirely escape, and remain healthy.

Trousseau, impressed with the inadequacy of Gubler's theory, directed his attention to the nervous centres. He was led to believe, from the fact that the paralysis usually terminates favorably, and because in certain fatal cases he was unable to discover any lesion sufficient to produce the paralysis in the brain, the spinal cord, or the meninges, that it did not occur from any structural change in the nervous system. Trousseau, an unsurpassed clinical observer, was not a microscopist, and, being unable to discover any anatomical cause of the paralysis, narrates the case of an entire crew of a vessel who were paralysed from eating an eel which contained some poisonous ingredient; and after alluding to instances of paralysis resulting from small-pox, typhoid and typhus fevers, and cholera, he continues,—"Well, then, diphtheritic paralysis belongs to the same category; its real cause is the poisoning of the system by the morbific principle which generates the malady on which the paralysis depends, and in regard to the mode of action of which in producing the paralysis we shall always, perhaps, remain in ignorance."

Since the time of Trousseau many eminent pathologists have endeavored to discover the anatomical characters and elucidate the nature of diphtheritic paralysis by patient and thorough microscopic examinations. I have already detailed the microscopic appearances in three of the cases observed by Cadet de Gassicourt. In 1862 Charcot and Vulpian examined the nervous filaments in the velum palati, paralysed by diphtheria, and found certain of them entirely free from medullary matter, granular bodies occupying its place; but partial degeneration was more common. In some of the fibres the medullary matter was intact. Lionville, in 1872, stated that he had observed degenerative changes in the phrenic nerves of a patient who had died of asphyxia following an attack of diphtheria. The contents of certain of the fibres constituting this nerve were amorphous, filled with granular bodies instead of the normal nerve substance. Ley-

den, in 1872, discovered lesions in the peripheral nerves and in the central organ, upon which he based his theory of an ascending neuritis. Roger and Damischino, in 1875, examined the nervous system in four children who had died of diphtheritic paralysis, and found atrophy of the nerve fibres in the peripheral nerves. The medullary matter appeared granular in certain points, and in others it had entirely disappeared, while the axis cylinder was not notably altered.

Such observations, to which others might be added, have fully established the fact of peripheral nerve lesions, such as would be likely to result from a neuritis, in the paralysis of diphtheria; but it must be borne in mind that the various observers, while they report degenerative changes in certain of the nerve fibres or tubes in the peripheral nerves of the paralysed part, also state that others in the same nerves were, to appearance, normal, and capable of performing their function. Such are the facts upon which is based the theory that diphtheritic paralysis is caused by peripheral nerve lesions—a peripheral neuritis.

In the endeavor to elucidate the cause of diphtheritic paralysis, attention has also, as might be expected, been directed to the state of the brain and spinal cord, and anatomical changes have been discovered in them quite as marked as in the peripheral nerves.

Buhl, Roger and Damischino, Pierret, Vulpian, Dejerine, and Oertel discovered in different cases, in the brain and spinal cord, in those who died of paralysis, various anatomical changes, among which may be mentioned small extravasations of blood and slight softening in the cerebral substance, extravasations of blood and thickening of the neurilemma in the roots of paralysed nerves (Buhl); endo- and perineuritis at the point of origin of the affected nerves; thickening of the walls of the vessels, and accumulation in them of white corpuscles (Pierret); rarefaction of the connective tissue, and degenerative change in the nerve cells in the anterior cornua of the cervical and upper dorsal region of the spinal cord (Vulpian); atrophy and granular degeneration

and fragmentation of the myeline in the nerve tubes in the anterior roots of the spinal nerves; increase of nuclei in the white substance (Schwann); disappearance of the axis cylinder and slight fatty degeneration of the walls of capillaries (Dejerine). Dejerine, in the microscopic examinations of five cases of paralysis, discovered anatomical alterations in the gray substance of the spinal cord, the white substance being intact. He observed in the gray substance' cells atrophied, or in process of atrophy, with the disappearance of their prolongations, so that healthy cells were comparatively infrequent. They seemed to have undergone the same changes as in acute or sub-acute myelitis. The vessels in the gray substance were dilated and flexuous. They were in a state of hyperaemia or congestion, and, at points, small interstitial haemorrhages had occurred.

Around the central canal and in the commissures, the nuclei were increased. The white substance of the spinal cord presented the normal appearance. These anatomical changes in the cord apparently resulted from a myelitis. The spinal nerves whose roots originated in the diseased gray matter of the cord, were found to have undergone a similar change in their peripheral distribution. Therefore, in the five cases in which such minute examinations of the nervous system were made, the lesions in the cord and nerves were similar.

In 1883, Dr. E. Hyla Greves, of Liverpool, pathologist to the Royal Infirmary, obtained permission to examine the spinal cord in a child of three years who had died of sudden heart-failure, after having suffered from an aggravated form of multiple diphtheritic paralysis. She had had anaesthesia of the fauces and all her extremities. Liquid food regurgitated through her nostrils and entered her larynx; she passed urine and faeces in bed; she could not stand or sit without support; her head dropped helpless; her speech was indistinct; her tongue could not be protruded; her respiration was slow and shallow; her pulse fifty per minute, and feeble; and she was nourished with enemata of pancreatised milk. The paralysis increased so that the diaphragm alone

acted in respiration; the pulse became slower, irregular, and more feeble, and death occurred suddenly. At the autopsy, which was limited to the spinal cord, the veins of the lower part of the cord were much congested. The white substance of the cord presented the normal appearance to the naked eye, but the gray matter of the lumbar and lower dorsal regions was extensively softened, and in the left half of the cord, diffluent, so as to flow from the section, leaving a cavity. Higher up in the cord the gray substance was hyperaemic, but not diffluent. The diffluent gray matter was unsuitable for microscopic examination, but other portions of the cord were examined with the following result: Many ganglion cells of the anterior cornua were destroyed, or in the state of "cloudy swelling;" others had lost their processes, and were reduced in size; increase in the number of nuclei in the neuroglia throughout the cord; gray substance in the right half of the cord in an early stage of softening; in the dorsal and cervical regions, everywhere the ganglion cells were in a state of "cloudy swelling;" no appreciable change in the white matter of the cord.

It is evident that this was an extreme and rare case of degenerative change in the cord, and one in which the paraplegia, had the patient lived, would have been permanent, for the diffluent gray matter in the cord could not have been restored to its normal integrity. It was not, therefore, an ordinary case, inasmuch as the paralysed muscles, as a rule, recover their function in those who survive.

Such is a summary of the lesions, peripheral and central, in the nervous system, which have been discovered in fatal cases of diphtheritic paralysis. I have presented the facts upon which the theory of the cause and nature of this disease must be based. Are we able to present a theory which will hold good in regard to cardiac paralysis, characterized by sudden heart-failure; to pulmonary paralysis, characterized by superficial or embarrassed respiration; to palatal and multiple paralyses with their many inconveniences; and to the loss of the tendon reflexes? Must we, with Trousseau, rest

satisfied with the belief that the manner in which diphtheria produces paralysis is beyond our comprehension, and will probably never be known? Dr. Abram Jacobi, seeing the inadequacy of the various theories to explain all cases or forms of diphtheritic paralysis, wrote, in 1880, as follows, in his classical treatise on diphtheria: "It may be positively asserted that diphtheritic paralysis does not in every case depend on one and the same cause."

The theory which is most strongly advocated at the present time, and which appears to be accepted by a large proportion of the specialists in nervous diseases, under the lead of Charcot, is, as has been stated above, that diphtheritic paralysis results from a peripheral neuritis. Others, observing central lesions in the nervous system, have naturally inferred that they have an important share in the production of the paralysis. It is very important that the practitioner, when confronted by this grave malady, should have a clear conception of its cause and nature, that he may be better able to apply the appropriate remedies. Let us, therefore, examine, with the light obtained from clinical experience, the prevailing theory that diphtheritic paralysis results from anatomical changes, peripheral or central, or both, in the nervous system. Is this theory adequate to explain the paralysis as it commonly occurs? I will give a brief summary of the objections to it, at the risk of repeating what I have already stated.

1. Cases occur in which carefully conducted microscopic examinations reveal an apparently normal state of the nerve supplying the paralysed part, and also of the nervous centre from which this nerve originates. Thus, in the three cases of typical cardiac paralysis described above, occurring in the practice of Cadet de Gassicourt, the pneumogastric and its branches examined in one case appeared normal, and no lesion sufficient to cause paralysis was found in a careful examination of the medulla oblongata, the central organ of innervation of the heart.

2. Palatal paralysis sometimes occurs as early as the second or the third day of diphtheria, and loss of the tendon

reflexes as early as the first day. Can we believe that a peripheral neuritis, or anatomical changes in the cerebro-spinal axis, have occurred at so early a date as to cause the paralysis?

3. In its commencement, diphtheritic paralysis often exhibits what Trousseau designates mutability. It suddenly shifts from one group of muscles to another. Muscles paralysed on one day have their normal action on the following day, while other muscles are attacked; and on the third day the group of muscles first attacked are perhaps again paralysed. This mutability of the paralysis, this sudden shifting from one group of muscles to another, militates strongly against the theory that the cause of the paralysis is a structural change in the nervous system, whether central or peripheral. It would seem impossible that there should be a sudden recovery from the paralysis, and then on the following day a recurrence of it, if it resulted from degenerative changes, either central or peripheral, occurring in the nervous system. These lesions do not undergo such sudden fluctuations, such mutability, as we observe in the paralysis. A persistent cause should produce a persistent and continuous effect.

4. Several, if not all, of the microscopists who discover degenerative changes in the peripheral nerves which supply paralysed muscles, state that some nerve fibres have undergone complete, or nearly complete, degeneration, others partial degeneration, and others still seem to be intact. Would complete paralysis result from such a state of the peripheral nerves? Would, for instance, the velum palati, as we observe it, be motionless like a curtain, not exhibiting the least motion when pricked by the point of a pen or other instrument, if the sole cause of the paralysis were degenerative changes in the nerves? Would not the nerve fibres which are still intact be sufficient to produce some motion? May we not, in at least some instances, regard the paralysis as the cause of the degeneration in the nerves?—for it is a well known pathological fact that if a muscle be paralysed, as, for instance, from a central cause, the nerves usually undergo more or less degenerative change.

5. A clinical fact, antagonistic to the theory that lesions in the cerebro-spinal axis cause the paralysis, has been alluded to by both Dr. Alfred Suss and Dr. William H. Thomson in their interesting and instructive papers. It is, that diphtheritic paralysis, motor and sensory, is sometimes limited to the muscles supplied by a single branch of a nerve, while the other branches have their normal function. This fact is, of course, not antagonistic to the theory that peripheral nerve lesions cause the paralysis; but it affords a strong, if not conclusive, argument against the theory that central lesions are the cause.

Such are the clinical facts which militate against the theory that inflammatory or degenerative changes in the nervous system are the primary and sole cause of diphtheritic paralysis. The theory relating to the causation of diphtheria, which is now gaining acceptance in both continents with pathologists and specialists in diseases of children, is, that the specific principle of diphtheria, probably a bacillus,—if not that of Löffler, perhaps the shorter one recently described by Emmerich of Munich,—acts locally upon the surface, and systemic infection occurs, chiefly from ptomaines produced by microbic action. The ptomaines, according to this theory, are taken up by the lymphatics or blood-vessels, enter the system, and poison the blood. Therefore, if this theory be true, the symptoms which indicate systemic infection are referable to the action of the ptomaines. Dr. Thomson, in his paper already alluded to, writes as follows: "It is quite conceivable that a ptomaine may follow upon the changes which the diphtheritic process sets up in the organism, and thus produce all its characteristic symptoms. The special tendency of diphtheritic inflammation to cause necrotic and gangrenous lesions lends farther support to this surmise."

The ptomaines spring into existence suddenly and unexpectedly under favoring conditions, as we see in case of the cheese or the milk ptomaine, the tyrotoxicon; and it is not improbable that chemistry, brought to the aid of microscopy, will yet reveal the fact that the common cause of diph-

theritic paralysis is a ptomaine or chemical agent, produced by microbic action. If the cause be a ptomaine, it probably acts in a measure like the poison of the eel in the cases related by Trousseau, or like curare. Clinical facts appear to harmonize best with the theory that this is the common cause of the paralysis, especially in those cases in which it occurs early and the use of the paralysed muscles is soon regained. But it would be idle to argue that the marked degenerative central and peripheral lesions, which are frequently present in the nervous system in those who have died of diphtheritic paralysis, do not prolong and intensify the paralysis, and perhaps are sometimes the primary cause of it.

Treatment. Mild cases of diphtheritic paralysis usually do well with simple treatment. Good diet and hygienic measures suffice for the cure. The patient is usually anaemic, and digestion feeble. Hence easily digested and concentrated nutriment is required. The peptonised foods may be very useful, and the pepsin preparations may be needed. The bitter vegetables, as quinine, and stimulants are beneficial in many cases.

The employment of the electric current is suggested by the nature of the paralysis as an important remedial agent, and many believe that they have obtained benefit from its use, while others speak doubtfully of its efficacy. If there is reason from the symptoms to diagnosticate central lesions in the nervous system, the galvanic current, in short sittings, has been recommended, and not the faradic. In ordinary cases, either the galvanic or faradic current may be employed. Strychnia is, however, prescribed by good observers as the most reliable nerve stimulant, and therefore more efficacious than electricity in the treatment of this form of paralysis. Oertel's objection to the use of strychnia, that, acting as an excitant of the spinal cord, it is likely to aggravate central lesions, is founded on a wrong understanding of the pathology of the paralysis. Prof. Henoch cured the paralysis in three weeks by hypodermic injections of strychnia. W. Reinhard (Deutsche Med. Wochensch., 1885, No. 19) states that a

boy of three and a half years, fifteen days after the appearance of the diphtheritic patches on the tonsils, had paralysis of the inferior extremities and velum palati, a tottering gait, nasal voice, and difficult deglutition. At the end of twelve days death seemed imminent; the paresis of the lower extremities had become a complete paraplegia, and the paralysis of the upper extremities, muscles of the nucha, larynx, and thorax was complete. He was unable to sustain himself in the sitting posture, his head falling heavily on his chest; he had dyspnoea, hoarse cough, tracheal rales, and aphonia. Reinhard made a hypodermic injection each day of one milligramme, or about $\frac{1}{65}$ grain of sulphate of strychnia in the nucha. Improvement occurred in twenty-four hours in the tonicity of the muscles; on the third day the tracheal rales had disappeared, and the respiration was more normal and deglutition possible. On the fifteenth day of this treatment, and after fifteen injections, the patient was considered cured. Dr. Gerasimow (Medicinik Obosr, 1887, No. 20) relates the case of a child of six years, who had paralysis of the velum, pharynx, larynx, and lower extremities. Six weeks after the beginning of these symptoms, subcutaneous injections of strychnine, two milligrammes, or about $\frac{1}{31}$ of a grain, were given daily. With this treatment, the patient improved; and after seven injections of this strength, followed by twelve of $\frac{1}{22}$ of a grain, the cure was complete.

With such strong testimony in favor of the use of strychnine, it is perhaps remarkable that physicians of experience state that they have not observed any marked benefit from its administration in the treatment of diphtheritic paralysis. At a meeting of the New York Clinical Society, held December 23, 1887 (N. Y. Med. Jour., Jan. 14, 1888), Dr. Holt stated that he was yet to be convinced that strychnine possessed any specific value in this disease, though it was of much benefit as a general tonic. At the same meeting, Dr. A. A. Smith stated his belief that tonics and time did more for diphtheritic paralysis than anything else. He had used electricity and strychnine, and had never been able to satisfy himself that electric-

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ity did any good; and the effects of strychnine seemed to be, not specific, but as a general tonic. On the other hand, Dr. Thacher, of New Haven, has reported a case in which galvanism was employed on the two paralysed arms alternately for a week at a time. It was invariably found that the arm receiving the electricity gained more rapidly than the one untreated, the strength being tested by the dynamometer. This test seems to have been conclusive as showing the efficacy of galvanisation.

The treatment of the most dangerous form of diphtheritic paralysis, the cardiac, obviously requires special consideration. No disease is more fatal, and none requires more prompt and intelligent treatment. As we have seen, the attack is usually sudden, with little forewarning, and is likely to prove fatal before the physician, however promptly summoned, is able to arrive. The patient should be as quiet as possible, in bed, with head low; and alcoholic stimulants should be administered at once.

In the sudden seizures, such as have been related above, hypodermic injections of brandy act most promptly in sustaining the heart's action. Ammonia, camphor, musk, and the electrical current may be useful auxiliaries. The predigested beef preparations, peptonised milk, and other concentrated foods designed for those with feeble digestion, are also useful in cardiac as in other forms of paralysis; but the patient should remain in bed so that any excitement of the heart may be avoided, as a recurrence of the attack is not improbable.

The President called attention to the lesson that was taught by the paper read by Dr. Smith. While children and grown persons often die of diphtheria—and fortunately but few die of its consequences—it must be a disease worthy of more than ordinary attention and investigation. Considering the histories given, the doubts and difficulties that surrounded every case, especially of paralysis, how could any one suppose that it was but a local disease? How could any one, thinking for a moment of the terrible consequences of a poison like this, believe that it was simply a local disease that could be washed away by a spray of any kind, or a caustic? He

had had an advantage over most people in his personal experience in getting the disease. Its aetiology in his case was very simple : it was a matter of inoculation, which he thought had not often happened. The inhalation of the fomitic breath was scarcely an inoculation.

He was bitten on one of his fingers by a child who shortly afterward died of diphtheritic croup. He paid no attention to it, but within four days after the accident he was not well. He was feeling tired, his bones ached, he lost his appetite. The fourth or fifth day after the bite a little pellicle formed upon the bitten spot. He did not think then it was diphtheria. He applied a bit of caustic potash, and took it out completely. In two or three days he removed the plaster he had put over it, and the pellicle was there the same as before. He reapplied the caustic, and again it disappeared; again it reappeared; but before he applied the caustic the third time the exudate appeared upon his throat, and he went through a regular attack of diphtheria. He got up and went out too early. In ten days after the time of seeming convalescence from the attack of diphtheria, his fingers and thumbs of both hands had a prickling sensation. He knew something was coming, but tried to work it off. He had no difficulty with swallowing or with vision at that time; and the power of his hand, except for the tingling, was the same as before. He engaged to go forty miles to a consultation, but before he started he was called to a case of confinement. On his way home from that case, he found a great deal of fault with the flagging; the stones on the walk were very uneven; he had to lift his legs very high to get over an imaginary unevenness. He went home, after a hard day's work, and went to bed, where he lay for four long months. The paralysis progressed in this way,—first his finger and thumb, then locomotion, then swallowing, then he had to get spectacles. One very curious thing happened;—speech was so difficult that it was hard to understand him; but one day, sitting in his office, when he was able to be up, though unable to walk without assistance and unable to write, a person came in to consult him about something. He turned his head upon his left shoulder, and asked the girl a question, with his voice as perfect as ever. He was so startled that he thought it was a mere accident. He restored his head to its ordinary position, and spoke as badly as before; again he turned it, and found his voice clear. It was a curious phenomenon connected with the condition of the muscles of phonation. How did it come about? Did he, by this twist of his neck, place certain muscles in a state of tension so that his voice was restored? He had no faith in electricity, but regarded strychnia as an excellent medicine. He took very large doses—one twelfth of a grain three times a day—and also cod-liver oil, with advantage. This twisting of his neck enabled him to swallow better, but he could not swallow solids at all until he was quite well, though he could drink fluids

pretty well, with care, the paralysis of the palate having been probably not so deep as in some instances. He did not know what kind of reflex he had before he was taken sick, but he had never had any since.

The monograph of Oertel had thrown more light upon the subject of diphtheritic paralysis than anything that has been written. How the degeneration that he describes could take place in a strictly local disease was unimaginable. Dr. Cronyn believed diphtheria to be always a constitutional disease—first, second, and last.

AN EASY METHOD OF FEEDING PATIENTS AFTER TRACHEOTOMY, OR DURING INTUBATION.

By Charles A. Leale, M. D., of New York County.

I desire to call the attention of the Fellows of the New York State Medical Association to a method employed by me for more than four years past, whereby children are easily nourished during times of unconsciousness, after convulsions or narcotism, and also during their wakeful moments, when, from either paralysis, wilfulness, obstinacy, coma, the presence of a tracheotomy tube, or during intubation, their lives have been endangered, either by the lack of proper nutrition or through the violent efforts to force the sufferers to swallow. All physicians are familiar with such scenes, and many of us have been requested to let the little ones "die in peace" rather than witness the violent contortions following spasm of the glottis in these attempts to sustain life. As I have seen many examples of the efficiency of this method of administering food and medicine, and as the physicians and hospital-trained nurses who have been under my observation at our large sea-side hospital had never heard of this simple resource, I feel it a duty to bring it to your notice, for I am convinced that I have saved a number of lives by this procedure.

Position. The child may either lie down, or, better, be held in nearly the sitting position, with one of its arms under the arm of the nurse, and the other held with the nurse's hand. The little one is thus securely placed in a fixed position.

Instruments. All that are necessary are a No. 8 velvet-eyed American India-rubber catheter, and a hand-syringe with a pointed nozzle to fit into the distal end of the catheter. In case of emergency, any soft pliable catheter or tube of the

same size may be used; and any syringe, or even the mouth, may be utilised to force liquids into the stomach.

Operation. This must be quickly done, with decision and firmness, after the catheter has been warmed, made very pliable, and well lubricated with either oil or vaseline. The point of the catheter, held between the thumb and forefinger, is steadily introduced through the nostril, directly backward (not upward), and quickly pushed into the stomach, from nine to twelve inches for a child. After this has been accomplished, which is done painlessly, and as a surprise to the little one, the free or distal end of the catheter is held by the operator, who keeps out of the sight of the child. The infant, finding that the presence of this small tube causes no inconvenience, soon becomes quiet. After a few minutes' rest the feeding should be begun. I have found the easiest way to be by means of a two-ounce solid syringe, which can be worked by one hand. This is filled with either the water, liquid food, or medicine, and its point firmly held into the opening of the catheter, when its contents are forced into the stomach. I have usually given eight ounces for each meal; and the food for an infant has been any of the thin preparations of milk, or simply pure water when thirst only was to be overcome. After all the necessary food has been thrown into the stomach, immediately withdraw the catheter; and the child soon presents evidences of the help it has received.

As not the slightest pain has been caused, the child, if awake during the operation, frequently falls asleep; and the bystanders feel charmed at the ease with which the administration of all foods and medicines is thus accomplished. Although I have visited many institutions, I have never seen this simple plan followed until demonstrated by myself. The old method of endeavoring to pass a tube through the oesophagus by the mouth of a child, or the employment of a large, stiff instrument, has done much harm; but, by following my directions, with a soft, well oiled, pliable, and small India-rubber tube, it is easier to give a hearty nutritious meal than a teaspoonful by the ordinary way.

A CASE OF SUPPOSED PARTIAL TWIST OF THE INTESTINE.

By George E. McDonald, M. D., of Schenectady County.

October 9, 1888.

On January 20th, of the present year, I saw, in consultation, a case of obstruction of the bowels, with this history:

The patient was a spare, female child, five years old, whose health before this attack had been good.

Just one week before my visit, a free faecal movement had naturally taken place. For four days prior to my seeing her there had been pain in the epigastric region, almost continuous retching and vomiting of mucus and bile, and frequent stools of blood and mucus, with severe tenesmus. The belly was not tympanitic: on the contrary, it was flat, and no tumor could be found. The tongue was moist and flabby, the pulse quick and feeble, and the temperature sub-normal.

A digital examination per rectum revealed nothing abnormal. The usual medicines, consisting of opium, calomel, etc., had been prescribed by her physician; copious enemata, medicated and of warm water alone, had been injected with entire failure. I myself passed a rectal tube fourteen inches in the bowel, and injected through it a large warm water enema, which was soon returned, entirely free from faecal odor and color, and, following it, attended with severe tenesmus, was a small quantity of blood and mucus.

The posture of the patient was peculiar. She would lie with the side of the crib pressing on the epigastric region, and would take the same position on the lap of her mother.

As the patient's condition was, of course, extremely critical, and as the usual medicines had been given a fair trial with no good result, I suggested to the parents the operation of abdominal incision. They gave their consent. I accordingly made the necessary preparations for the performance of the operation. Chloroform was administered, and while under its effect a very thorough and complete examination of the belly, by manipulation and kneading, was made in the hope that a tumor might be found. None, however, was discovered by the six physicians who made this examination. While I was manipulating, I thought that possibly good might result from this procedure, and concluded that it would

be well to postpone the cutting for a few hours. It was then 9 P. M. On the following morning, at 8 o'clock, we again saw the patient. She had passed a bad night,—had vomited and retched frequently, but had made no attempt at stool. Preparations were once more made for the operation. Just before the chloroform was to be administered, the patient, by her wish, was placed upon a commode, and, fortunately for all concerned, she had a faecal passage, liquid, not foetid, dark brown in color, and containing no membrane or shreds of membrane. Other movements of the same character occurred in a few hours, and recovery rapidly took place.

It may be the opinion of some of my hearers that this was a case of obstruction due to faecal impaction. I think not, for it is to be noted that no hard lumps appeared at any time in the movements. I have never treated a case due to faecal impaction in which scybala have not been present in the matter passed per anum.

Intussusception could hardly have caused the condition mentioned, for the reason that the manipulation of the patient's abdomen could not have freed the sequestrum from its envelope so long a period after its invagination. The contiguous surfaces would have been so firmly united as to have prevented it. The alvine discharges contained but little blood. They were never so bloody as frequently happens in obstruction from invagination.

As has been stated, the belly was entirely free from distention; its walls were lax and loose; the spinal column could easily be felt through them; and, had a faecal tumor existed, it could have been detected. The absence of tympanites can be ascribed to the obstruction existing high up in the intestinal canal. In my opinion a partial twist of the intestine was relieved by one of the six pairs of hands which so thoroughly manipulated the patient's belly while she was under the influence of chloroform.

DOES THE MENSTRUAL FLOW ORIGINATE IN THE TUBES?—THE ACT OF MENSTRUATION VIEWED FROM AN INVERTED UTERUS.

By E. J. Chapin Minard, M. D., of Kings County.

October 9, 1888.

During a visit, in August, to my friend, Dr. H., of Warren county, New York, I was invited to see a case of inverted uterus, which had been under her observation for treatment a short time before my arrival.

History. Margrette—age about thirty years, multipara, occupation a basket-weaver—was delivered, five months before, at term. The placenta was adherent, and the attendant pulled it away, leaving the vagina filled with a mass supposed to be a tumor. When she applied to Dr. H. for treatment, she was much reduced, and nervous. Upon examination, the uterus was found to be inverted. Proper treatment was given; and when she was able, a reduction was attempted, but failed, because the patient refused to take an anaesthetic, and was too feeble to have it done without. She left the place, and returned a few days before my visit.

She came to the office, complaining of haemórrhage. It was found that she had been menstruating for four days, for the first time in five months, or since the birth of the child; that she was flowing more freely than was her normal habit, and had much pain, nervousness, and prostration.

Having seen but one case, and that through the courtesy of Dr. Mundé, at Mt. Sanai Hospital, a few weeks before, I was eager to examine the case and watch the act of menstruation, and to settle in my own mind a point which advanced gynaecology has been foreshadowing for some time,

viz., that the tubes play the most important part in the act of menstruation.

Upon examination, I found the diagnosis of inverted uterus correct,—the left ovary filling Douglas's cul de sac, and the right one lodging above the ring formed by the neck of the uterus, and the tubes dragged down and put on a strain in the sac formed by the peritonaeal surface of the inverted uterus. The surface of the tumor was of a dark red color, studded with points of a darker hue, and resembled the tongue of a bad case of scarlet-fever without the creamy coating. From this surface no discharge, to speak of, could be wiped away with cotton; but from the tubes a dark, healthy, menstrual (non-fibrinous) flow passed out, drop by drop, and when the tubes were pressed upon would form a stream for an instant.

If the menstrual flow does take place from the tubes, many things will be made plain which now complicate gynaecological and obstetrical practice, and will overturn hitherto preconceived ideas with regard to the functions of the uterus and its appendages.

Dr. Johnston, of Kentucky, the leader in advanced researches on the uterus and menstruation, divides the uterus into two segments, the neck and body, the functions of which differ materially. Again: He demonstrates "that the corporal endometrium has an entirely separate nerve plexus, entering it at either cornu from the centres embedded in the broad ligaments and tubes." He makes the body of the uterus an entirely separate organ, with its special nerve supply, and with its distinct function.

Again: The openings of the tubes of this inverted uterus were dilated so as to admit the head of a small uterine sound.

Do the tubes dilate during the menstrual flow? If so, may not application of fluids be made directly to the diseased tubes, as the ureters may be catheterised, in cases where operations are not advisable? And may not tubal pregnancy be more explicable? Mr. Tait says all atopic conceptions are primarily tubal.

In this case of a healthy woman, the excessive flow was

undoubtedly caused by the hyperaemia of the tubes from the dragging strain and misplacement of the uterus.

In Battey's operation it is proven that the failure to produce the menopause, which sometimes happens, occurs from not removing the tubes close to the uterus.

Does the scanty flow of the menstrual blood, which first induces women to seek medical advice, and which often precedes graver diseases, tend to show that the menstrual flow has its origin in the tubes?

REPORT OF THE MICROSCOPICAL COMMITTEE.

By Charles A. Leale, M. D., of New York County.

October 9, 1888.

At the last meeting of the New York State Medical Association (see page 69 of the Transactions), I was appointed a committee of one to solve the question in regard to the character of the specimens presented by Dr. R. H. Sabin.

Microscopical sections of several of them proved that they were seed. I then planted a number of them, hoping that one or more might grow and demonstrate the source from which they came; but they had lost all vitality. I then submitted them to the examination of several of our largest dealers in seed, to a large number of physicians, and to several botanists; and, while continuing my researches among the foreign illustrated botanical works, I received a letter from Dr. H. Sabin, stating that they were raspberry seed. They must therefore have been taken into the stomach by the patient, and may have been lodged in some abnormal diverticulum of the intestines, where they remained until the violent peristaltic action of the bowels, during the attacks of biliary colic, caused them to be passed into the general intestinal canal, and subsequently to be passed with the faeces.

ADDRESS ON SURGERY.

By William H. Carmalt, M. D., of Connecticut.

October 10, 1888.

I do not need to enlarge upon the importance of the subject on which I shall have the honor to speak, as a reason for selecting it, but rather to explain that having had occasion, within the past three years, to operate upon four cases of growths of the tongue,—one of tuberculosis, one of sarcoma, and two of carcinoma,—the various factors in the problem of the removal of the disease to the best interest of the patient have presented themselves so strongly to my mind that I have ventured to hope that the matter will not be uninteresting to the distinguished audience I have the honor to address. I shall not attempt to give the points of a differential diagnosis of these cases. These are undoubtedly familiar to you all, and I do not know that I have anything of value to say in that connection, but shall confine my remarks to the consideration of the operations best to be employed in the removal of the latter class, *i. e.*, carcinoma.

The history of individual cases of this disease, passing under our own observation, of which you have perhaps all had some experiences to record, agrees with those reported by writers on the subject, *i. e.*, its inevitably fatal termination, and usually with great distress. The condition of a patient suffering with inoperable cancer of the tongue is generally one of the greatest suffering,—first, from the pain incident to the infiltration of the parts by the growth; second, from the difficulty, or even inability, to swallow, which pertains not only to nourishment, but to the saliva; third, from the annoyance of the constant dribbling of the saliva, with the almost intolerable foetor of the breath, loaded with the products of decomposition, rendering attendance upon the sufferer well-

nigh impossible; fourth, from the more or less frequent attacks of impending suffocation, which, once experienced, is never forgotten, and always dreaded. These, together with the consciousness that there is to be no relief, that death is, sooner or later, to come from the disease itself, makes the condition of the patient so wretched that the very thing we, in duty bound, strive to avert or postpone, namely, a speedy death, is really the one thing most devoutly and earnestly to be hoped for.

In common with all carcinomas, there can be in the minds of surgeons but one opinion as to the necessity of a radical extirpation of the disease and its containing organ whenever its character is fairly established; and it is to the means to that end that I shall mainly direct my remarks, and ask your indulgence (although a passing consideration of the frequency of the disease and of the more immediate and existing causes may not be out of place).

In the reports of the Board of Health of the State of Connecticut for the four years from 1884 to 1887, inclusive, being the only years in which an attempt has been made to classify the locality of the part affected, I get the following facts of 1,227 cases of *death* reported to be from "cancer:" In 231, the seat of the disease is not stated, but of the remaining 996, twelve are given as cancer of the tongue, and of these, in 1886, in three the sex is not given; of the remaining nine, but one was a female, and but one (another) case was reported as under forty. Taking into consideration the different data from which such a report is made up, as compared with the tables given by Winiwarter, Barker, Worfler, Morris, Butlin, and others, of cases in hospital and private practice, most of which it is safe to assume were operated upon, the comparison as well as the points of agreement has a certain value. It is quite probable that all the cases of cancer of the tongue were reported as such. In the fatal cases, the disease is too readily recognised to be omitted in the reports; and it may therefore be assumed that the proportion of cases of cancer of the tongue to all cancers is about one per cent. These figures give more reliable data as to the relative frequency of

the disease than the reports of hospitals, where those of the poorer class, seeking relief by operation, oftenest apply and get recorded, while those operated upon at home go unmentioned. On the other hand, again, none of the cases cured by operation (or otherwise) are mentioned at all: these classes probably about balance each other.

Without desiring to encroach upon the discussion to which the afternoon session is to be devoted, in which the origin of carcinoma will undoubtedly be considered, I may be permitted here to state that the clinical histories of cancer of the tongue illustrate the general law of the origin of all carcinomas, glandular as well as surface, in that the immediate exciting cause is some prolonged but moderate irritation, occurring in a person at or beyond the age of maturity, as the period of regres sive metamorphosis approaches or has been established. Butlin calls especial attention to the immunity of childhood and youth; and Barker, in his most excellent article in Holmes's System of Surgery, in a group of 290 cases collected from various authors, finds but eight in the decade between twenty and thirty years, and mentions the youngest recorded as being twenty-six years. This is in corformity with Billroth's asserted law of the antagonism or struggle for life between the connective and epithelial tissues, being perpetuated in their respective tumor growths, the latter class predominating with advancing years by overpowering the feebler resistance offered by the former tissue to the regressive metamorphosis of age.

There can be no doubt that the presence of a local irritant has a great, if not an actual determining, influence in exciting the disease. The cases reported are in a large majority males. As far as I have been able to gather from various authors, the proportion is as between six and seven males to one female, though the statistics of the Connecticut State Board of Health make it much less. There can be, of course, no sexual difference; but in the habits of males, as relates to the hygiene of the teeth and mouth being so much more careless—perhaps better to say, filthy—than is usual to females, we have an explanation of the greater frequency of this particular disease.

In a great majority of the cases, we find, in about the order mentioned, jagged teeth, perhaps covered with an incrustation of "tartar," against which the tongue continually rubs; the constant biting or nibbling at a part originally injured accidentally; the frequent contact of irritating substances to the tongue, as rough pipe-stems, or perhaps the habitual use of hot drinks. Smokers are frequently mentioned as having lingual cancers, and the condition, known under the various names of psoriasis linguae, leukopakia, etc., is regarded as frequently the result of this habit.

From this it is evident that there is no difference in the origin of the disease here and in other places. There is always a prolonged local source of irritation, not sufficient to excite an actual inflammatory process, tending to repair, but enough to excite an increase in the growth of the deeper layers of the epithelial cells in the manner characteristic of carcinoma everywhere. If this be but recognised early enough, and the cause removed, the epithelial growth may often, indeed probably can always, be averted. The real difficulty is that patients do not know the danger they are running by allowing the irritation to continue, and do not apply for help until the disease has become so advanced by infiltration into the muscle and connective tissue that nothing short of its total eradication can be advised. Mr. Jonathan Hutchinson has defined a pre-cancerous stage, during which period something may be done toward averting the disease. In defining and giving this period a name, he has, however, but emphasised what every practical surgeon has previously, though perhaps unconsciously, attempted, here as well as in other situations. Who of us but has been consulted for suspicious ulcers of the lips or persistent nodules about the skin of the face, of which he was in doubt, but which disappeared under appropriate treatment without operative interference; and yet many others of precisely the same characters, subjected to irritative treatment or no treatment at all, have developed into extensive cancerous ulcerations requiring the most radical operative interference; —and this is all there is to the so called pre-cancerous stage.

The asserted great malignancy of cancer of the tongue refers to its rapid growth after having entered the loose intermuscular connective tissue of the organ so plentifully supplied with lymphatic spaces and vessels, and which are in such close connection with the lymphatic glands of the floor of the mouth and under the jaws. This is, indeed, next to the existence of the disease at all, the most important and peculiar feature of tongue-cancer, namely, the proximity to and intimate connection with the glandular lymphatic system, causing rapid growth when access has once been gained to it, and rendering operative interference both imperative, and at the same time difficult of complete accomplishment.

I beg leave to refer those of my audience, who have not seen it, to the history of operations for the extirpation of the tongue in the article already mentioned by Mr. Barker. In that article he gives at length, in chronological order and systematically classified, the various operations that have been practised. He describes as irregular the operations previous to 1803, and separates those since that date into those performed by ligation, by wedge-shaped excision, by the écraseur, with division of the cheeks, with a preliminary ligation of the lingual arteries, with division of the lower jaw, and, lastly, the various forms of infra-maxillary or sub-mental operations.

By the simple recapitulation of these operations, we may appreciate the great difficulties surgeons have met in dealing with the disease; for we may regard it as a law in surgery, as in the practice of medicine, that where a great variety of remedies or proceedings is recommended, no one is of sufficient certainty to command the favorable judgment of all operators or practitioners. Surgeons are not seeking for operative novelties for the sake of the novelty: they seek new ways for overcoming a difficulty because those already adopted or advised are unsatisfactory. How are extirpations of the tongue unsatisfactory? Simply because a large proportion of the patients die (*vide* Barker, Holmes's System of Surgery, Vol. II, pp. 606, 607), and they die either as the immediate consequence of the operation, or from a return of the cancer-

ous disease. As the more or less direct result of the operative interference on the part of the surgeon, death comes in two ways,—first by haemorrhage, primary or secondary; and second, from septic pneumonia in some form. The third manner in which death occurs, *i. e.*, by recurrence, takes place either in the stump or in the neighboring glands.

The first of these—haemorrhage—is almost entirely in the hands of the surgeon, and preventable. In the operations heretofore usually practised through the mouth, the lingual arteries are the only vessels which bleed sufficiently to require more than pressure to control. They must be ligated in some part of their course, or twisted. American surgeons, as far as I am aware, have not yet adopted the practice of torsion alone, which Mr. Whitehead says he employs almost exclusively; though, if one could bring oneself to regard it as safe, it would certainly relieve him from much tedious manipulation. It is difficult to tie the bleeding end when the tongue is removed at its base; and if a preliminary tracheotomy is not done and the fauces tamponed, the blood flows into the larynx with all its attendant inconveniences of choking and coughing,—the temporary cessation of the operation, the returning consciousness from the anaesthetic, and the consequent prolongation of the operation, even when death does not occur, as has happened at times from suffocation. If my memory serves me, I think that death has not occurred from haemorrhage itself at the time of the operation, uncomplicated by the entrance of blood into the trachea; but this is a serious accident, both remotely as well as immediately, by reason of the danger of septic pneumonia, which the decomposition of the blood in the smaller bronchi causes. Mr. Christopher Heath's suggestion, to grasp the base of the tongue with the two forefingers and hook it forward and upward, controlling the haemorrhage, and at the same time bringing the stump into a more accessible situation, is of great practical utility. In any method of operating, however, which does not include either the preliminary ligation of the lingual arteries above the hyoid bone, or the tamponade of the pharynx, the services

of skilled assistants are imperative,—one skilled in wiping away the blood both from the field of operation and from the pharynx, skilled in the management of the gag, skilled in recognising when to do and when to keep out of the way. Equally skilled must the assistant be who has the administration of the ether in charge, to keep the patient sufficiently anaesthetised not to suffer pain, and yet not so unconscious as to be unable to clear his throat by coughing. It is true that Fux (Wiener Med. Wochenschrift, No. 14) reports having extirpated a tongue quite painlessly with cocaine; but my experience with cocaine in general surgery, for such extensive operations as this, has not led me to care to attempt it. With skilled assistants, however, the testimony of Whitehead and of Jacobson, of Guy's hospital, shows that danger from haemorrhage in operating with the scissors through the mouth, without preliminary ligature of the linguals or tracheotomy, may be done with as good results for the time as by any other operation. The question of its applicability to extensive secondary involvements will be discussed again. But we do not all have skilled assistants. Surgeons and assistants must at some time be beginners, and must seek a means by which they can avoid the inconveniences and dangers mentioned.

In 1833 Mirault (Barker) and Flaubert (Winiwarter) introduced the ligation of the linguals as a preventive of bleeding, and were followed by Ring, who died in 1836. The plan did not, however, find favor until Billroth revived it about 1872, since which time it has been frequently adopted. In one of my cases I practised it, and certainly had a very clean and dry field to operate in. I think there was not more than a drachm of blood lost; there was no necessity for any sponging. The operation of ligation, however, requires a good deal of time. The artery is small and well hidden, and the dissection must be very carefully made in order not to tie the hypoglossal nerve instead. In more than one instance this has been reported to have occurred. It happened on one side of my second case, and my experience with this has led me to regard it as not very important, for, while I had

some haemorrhage when that side of the tongue was divided, it was not troublesome. I was then doing Kocher's operation, to be referred to more at length hereafter. In case one ties the artery, however, I must emphatically recommend the operation in the digastric triangle, known generally as Hueter's operation, though practised before his description.

Of infinitely more importance, however, as an actual cause of death, than haemorrhage, is some form of pulmonary sepsis. Without attempting anything of completeness in either the actual number of deaths or of the finer details of the pathological processes in the lungs, I take simply deaths in which the cause was given, following all forms of operations, not including in their scope means to avoid this particular danger, and which may be regarded as due to the operation; therefore not considering recurrences. These are taken principally from Mr. Barker's article, and include many operators, and also a list by B. von Langenbeck reported to the Tenth Congress of German Surgeons, 1881, and Mr. Whitehead's list reported to the International Medical Congress, in London, of the same year. They include fifty-nine cases, of which forty-five died within two weeks after the operation (the greater number within the first eight days), and of these, thirty-six died of some form of acute disease which might honestly be regarded as septic; and in all but four, some form of pulmonary disease—as gangrene of lung, broncho-pneumonia, suppurative pleuritis—is especially mentioned. These four are designated simply as septicaemia. It is therefore evident that the greatest danger immediately resulting from the operation is a secondary affection of the lungs, due to the absorption, by inhalation or contact, of the products of decomposition from the freshly cut surface, or by the decomposition of blood escaping therein during the operation. This condition is so frequent after wounds or disease of the upper air passages, accompanied by foul discharge, that our German colleagues have given it a particular name—"schluck" pneumonia. I do not know that we have so graphic an equivalent in our language, but it recognises a mode of pulmonary infection unfortunately not

rare, and in the class of cases now under consideration, the principal cause of death. Can we do aught to meet this? The first suggestion which naturally arises is, to make the wounded surface aseptic. Great care in frequently washing out the mouth with an antiseptic cleansing solution, and keeping the fresh surface covered with some similar preparation in the intervals, may do much toward accomplishing this end; but the procedure is annoying and troublesome to the patient, and its successful carrying out depends so much on the persistence, faithfulness, and skill of the nurse or other attendant that failure often takes place. With this in view, the alternative was suggested, simultaneously, but in distant countries, by Barker, of London, and by Kocher, of Zurich, to do away entirely with the mouth and nose, as the track for getting air into the lungs, by doing a tracheotomy preliminary to the extirpation of the tongue. The advantages of this procedure are enormous. In the first place, the pharynx may be plugged up, and all of the most trying inconveniences of blood getting into the trachea are entirely done away with. Secondly, the administration of ether is removed from the operating field. These two things alone, even if the tracheal wound were closed immediately after the operation was finished, are sufficient to justify the procedure if the lingual arteries are not tied; but these are not all. By keeping the pharynx stopped up, the wound in the mouth may be treated with a dry antiseptic dressing, the moisture absorbed into it, and the parts kept sweet; or, if preferred, though I think it not so good a plan, the mouth may be frequently washed out without disturbing the patient. There are none of the inconveniences to the patient of movement of the wounded parts, no swallowing of saliva, nor is he or the nurse obliged frequently to sop it up. The parts being kept quiet, there is little or no secretion of saliva.

The problem of feeding is reduced to first principles: A soft rubber feeding-tube (as they are made now, with a funnel-shaped extremity, though that is not of much advantage, a glass funnel being cleaner) is introduced into the stomach,

perhaps allowed to remain there, with packing around it; and milk, beef tea, or other fluid nourishment is poured down *ad libitum*. The patient has no more trouble or care about his food and drink than the chickens artificially fed at the Jardin d'Acclimatation in Paris. Indeed, my last patient had a considerable sense of humor, and often expressed himself as being in the lazy man's paradise. He suffered nothing; his physical wants were anticipated by the nurses; he had nothing to do but to live. The relief, in contrast to his wretched condition before the operation, was immeasurable.

The plan, however, that I prefer to all others is, to pack the mouth and fauces with Billroth's sticky iodoform gauze, as modified by Weir, consisting of resin 10 parts, castor-oil 6 parts, alcohol 16 parts, and iodoform 5 parts, to saturate 25 parts by weight of gauze. This gauze is torn into strips, and the fauces and mouth packed with it around the stomach-tube. The latter may be arranged as the chemisetted catheter in the operation for stone, and thus all trickling down the side of the tube avoided, though this is not of much importance.

The tracheal cannula should be kept in place, and the fauces plugged up until healthy granulations form over the wounded surface, when both may be removed; and the patient will then, also, usually be able to dispense with the stomach-tube. Some patients are awkward about first learning to swallow without a tongue; and a short tube, opened at the end (an ordinary rubber drainage-tube), introduced simply into the upper end of the oesophagus, may be used for a short time longer. After a healthy granulating surface has formed, the dangers of septic pneumonia are so much reduced that they may practically be disregarded.

The third cause of death is more remote; but unless the most thorough precautions against it are taken, it is the most inevitable,—namely, recurrence, either in the wound or in the neighboring glands. A recurrence in carcinoma means an incomplete operation. I make a distinction in this respect between the growths we are considering and sarcomas. We may be excused by reason of non-accessibility, or some other

obstacle impossible to overcome, or too extensive growth, in leaving a portion of the diseased tissue,—whether original growth or affected gland is precisely the same; but it is still an incomplete operation. And we have now to consider how to overcome this in the most complete manner. On this point we have to bear in mind always the pathology of all carcinomas: first, that there are two general types,—the fibrous carcinoma, or scirrhus, and the medullary carcinoma, or encephaloid (though I most sincerely wish these two incorrect and misleading expressions could be forever banished from our nomenclature); that the former is of comparatively slow growth, and for a time bounded in by the development of the fibrous tissue, and the secondary glandular participation is correspondingly late; that the latter is of rapid growth both locally and by glandular participation. But, second, that glandular participation is absolutely sooner or later certain. And third, that we never can be sure beforehand that the glandular infection has *not* taken place. The glandular disease occurs by the penetration of the bastard epithelial cells which compose the growth into the ultimate lymphatic channels, by which course they are carried to the glands. These channels are microscopic in health, and it is not until they are greatly transformed by being packed full of the cancerous growth that they are at all recognisable; and what is true of the lymph channels is equally true of the glands. Who of us, in operating for mammary cancer, has not, in cleaning out the axilla, found chains of enlarged lymphatic vessels and glands quite unappreciated by the touch before they were laid bare by the incision through the skin? I doubt if any one of my audience to-day operates for mammary cancer without continuing his dissection to include the whole chain of lymphatics from the mamma to the interpectoral connective tissue, and from that into and including the whole axillary tissue. We must learn to do this for all other situations as well. In cancer of the tongue we must include the subjacent glands and the intermediary chain of vessels, and the question of a choice of operations turns upon how

we can best do this. Time does not permit me to give a complete sketch of the various operations which have been practised since in 1658 Pimpernelle first successfully "excised" the tongue, or in 1664 Marchette extirpated a cancer by the actual cautery. Besides, it is quite unnecessary, since Barker's article, already referred to, is accessible to all, and I must be brief.

Three main plans have been adopted: First, the simple ligation of the diseased mass in various ways, from simple ligature with inelastic cords to the écraseur, the galvano-cautery, or the elastic ligature. These were, and still are, I am sorry to say, introduced in various ways through the mouth or under the jaw, and the parts more or less rapidly strangulated, or torn, or crushed, or burned off. Modern surgeons, with few exceptions, have condemned them all; and although the names of B. von Langenbeck and Richard Barwell are associated with recent operations of this kind, the former using the thermo-cautery, the latter advocating the écraseur introduced just above the hyoid bone, I must humbly express a decided disapproval, inasmuch as they do not meet the indication which a more accurate pathology teaches it is essential to meet, namely, the total eradication of the neighboring glands. Of the two methods, I must express my preference for the galvano-cautery, as its caustic effects extend beyond the line of the incision, but the slough is a long time in coming away, and the patient is inhaling the products of decomposition a long time. If practised at all, these operations should be restricted to the early stages of the fibro-carcinomas. They are not adaptable to the medullary form, or to cases of long standing. As far as I know, a preliminary tracheotomy is not practised along with this method.

The second plan is that of removal through the mouth. There are many varieties, and in some form or other it is probably still the one most frequently practised. It is unnecessary, perhaps, indeed impossible, to describe all the modifications capable of being made to it to meet various indica-

tions of the situation and extent of the disease. In its purest and simplest, and according to the results the most successful form, it is known as Whitehead's operation, from the distinguished Manchester surgeon who has most extensively practised it. It consists in simply cutting the tongue out with a pair of straight scissors, tying the lingual arteries as the operator comes to them, dividing the tongue at the hyoid bone, and cleaning out the floor of the mouth. If there are enlarged glands beside those in the floor which are taken out at the time the tongue is removed, Mr. Whitehead removes them by external submental incision, either at the time or subsequently. Modifications of or additions to this, worthy of mention now, are the splitting of the cheek backward (Jaeger) to allow more room in operating, or division of the jaw at the symphysis (Roux, known in English surgery usually as Syme's operation), or at the side in two places, removing and replacing a piece of bone (Billroth's osteoplastic). These were all more or less successful, depending first, of course, upon the extent of the disease; second, upon the thoroughness with which the cavity of the mouth was cleaned out. The results of these operations still left a great deal to be desired; recurrences *in loco* were frequent; the patients were subjected to what all could not regard otherwise than as a horrible mutilation with but a moderately successful compensation. To be sure, life was usually prolonged, and in many cases, indeed, the recurrences were in distant parts, and the end much less agonising than with the disease in the original situation. In the meantime, and along with these, what I shall call the third method of operating had been on trial, namely, the infra-maxillary or submental operations, both for the introduction of the wire of the écraseur as above stated, and also as allowing greater facility for getting at the base of the tongue and the floor of the mouth. The incisions were made in the median line or parallel to the rami of the jaws on one or both sides, or both incisions were made and double flaps formed. They were short or long according to the views of the operator.

Regnoli, in 1838, was the first to employ the incision in this position, and Czerny and Billroth modified his procedure, getting flaps from before backward, and thus more room; and I find, by a reference in Virchow and Hirsch's Jahresbericht for 1887, just at hand, that Heineke, through his student Locbinger, proposes to make the flaps with their apices at the hyoid bone, and their bases at the jaw on each side, claiming better access to the base of the tongue. The practicability of this operation has as yet only been demonstrated on the cadaver. These operations, however, have the objection in common that they have not taken into sufficient consideration the abundant connections between the diseased tongue and the lymphatic system, which must be removed along with the tongue in most instances. Operating from within the mouth, unless the glands have already attained a considerable size, these largely escape observation; they cannot be seen, and may not be felt, when already the seat of the cancerous deposit, and, if left, serve as the nucleus for a recurrence.

These glands are in two general groups—superficial and deep;—the former, lying under the angle of the jaw, beneath the platysma myoides, are not so soon affected as the deeper, and only after these have been some time diseased, for there is no immediate connection between the tongue and the superficial glands of the face and neck, the deeper glands being interposed. The deep are arranged about the vessels, the branches of the internal maxillary artery and vein and the lingual artery lying under the mylo-hyoid and hypoglossal muscles; and, unless the operation is planned with direct relation to their exposure, they will probably not be all removed. Again: The deep cervical glands extending in a continuous chain along the carotid artery and jugular vein, it is quite impossible in the operation from the mouth to remove more than the uppermost, while the lower may require removal as well. To meet this indication founded upon the plainest rules of surgical pathology, Kocher, in 1880, so modified the sub-maxillary operation as to allow the greatest

possible access to glands, and at the same time gained complete control of the disease in the tongue, even to the hyoid bone. This method may be designated as an operation for the radical extirpation of the tongue, using the term radical in its double sense of complete removal, and attacking the root of the organ. The first step in the operation the author advises is the ligation of the opposite lingual artery, then the preliminary tracheotomy, with plugging of the fauces, and he then proceeds to the extirpation of the glands and tongue. To this end the incision is to be made along the anterior border of the sterno-mastoid muscle from just below the tip of the ear to nearly opposite the hyoid bone, then along this and the anterior belly of the digastric muscle to the chin. This incision is carried through the platysma, and the flap thus formed is reflected up over the face. This exposes the upper superficial cervical glands, which are removed. The lingual artery on this side is now tied, and the dissection carried through the hyo-glossus and mylo-hyoid until the mucous membrane of the mouth near the jaw is reached; during this the facial artery will probably be divided and require ligation, and the uppermost of the deeper layer of lymphatic glands are removed. Having secured all bleeding points and removed all glands, including the submaxillary, the mouth is opened into, and the tongue is now accessible in its whole length. The mucous membrane and muscular attachments, *i. e.*, the hyo-glossus of the opposite, and the genio-hyo-glossi of both sides, are now divided, and the tongue may be drawn out of the wound and the whole abscised at the hyoid bone; or, if but the half is to be removed, it may be split down the median line with a knife, and the portion desired taken away. I must warn, however, against being too conservative in this respect. The half of a tongue is not of much use, and we run a great risk by leaving any portions of the cancerous growth, which may have penetrated into the abundant fatty connective tissue to the other side of the tongue. Kocher uses the Lister spray; but strict antisepsis may be carried out without this. The dress-

ing of the stump of the tongue may be made with dry iodoform, or with the iodoform gauze; a large drainage-tube carried into the wound from the mouth to the most dependent part of the neck; the rest of the wound sewed up, and the whole enveloped in sublimated cotton, etc. The single case in which I carried out this plan died six weeks afterwards of a pneumonia, brought on by reckless exposure to severe cold after the wound had all healed up except the track from the drainage-tube.

I beg to make the farther suggestion that a tracheotomy, with the introduction of a stomach-tube for feeding purposes, to be kept in for considerable periods of time, may mitigate some of the discomforts of inoperable carcinomas of the tongue and fauces.

RAILWAY INJURIES.

By Chas. W. Brown, M. D., of Chemung Co.

October 10, 1888.

There may be no valid reason for speaking of railway injuries as a separate and distinct class, but as injuries produced by car wheels and car-bumpers have many distinctive characteristics, both as regards the effect upon the individual injured and the best plan of treatment to be pursued for their relief, and also because of the rapid increase in the number of such cases, as the railways enlarge the amount of business and consequently employ a larger number of men, it is important that we should give them special attention.

In presenting this subject to your notice, I only hope to place before you some facts obtained from my experience in the treatment of quite a number of cases which have come under my observation.

So characteristic are most injuries produced by railways, that the surgeon who has had large experience in this class of cases will usually be able, by examining the injury, to tell what part of the machinery produced it. For instance: When a hand or fingers have been caught between the draw-heads, the parts are nearly, if not completely, cut through; and when between the bumpers, the parts are crushed to a pulp, the skin burst open, and the soft parts pressed out through the opening; and when the forearm or arm is caught by the bumpers, the bones are frequently forced up or down, and shot out from the two bumpers (like a cherry pit from between the thumb and finger), and the soft parts burst open on the side of the limb from which the bones are forced out.

When the wheels have passed over a limb, it is frequently mangled and torn to shreds, as far as the wheels came in con-

tact with it,—though I have seen many cases where from one to a dozen wheels of loaded cars had passed over a leg, which had on it a heavy sock, a heavy boot-leg, and thick trousers, and after removing these the skin was found unbroken, and to a casual observer would not show even a mark of injury at the point over which the wheels had passed, but was slightly enlarged by the stretching of the skin from the haemorrhage beneath it; and when the knife was thrust through the limb at the injured point it would collapse like a broken bubble, all the soft parts except the skin, bone and all, being reduced to a fluid pulp. In one case, a few years ago, a Swede, working on the track, who was very deaf, and did not hear the order which was given the men to clear the track for the gravel train, was knocked down by one of the cars, and ten wheels passed over his right leg and foot. The limb was protected by a heavy boot reaching nearly to the knee. The leg presented the same appearance as described above: the skin did not appear to be even bruised, but was hard, distended, and pale. On amputating the leg at the upper third, as soon as the knife was passed through, the skin of the whole leg below collapsed like an empty stocking, and there was not a piece of the tibia or fibula two inches long, from the lower extremity to the junction with the upper third.

Fractures of the long bones are very liable to be compound, as, when brakemen jump from the top of cars to save falling, or when cars are going down the bank, the force is so great that the bones are driven through the soft parts.

Fracture of the patella was produced by muscular force in two cases, by brakemen jumping from trains in motion.

Injuries produced by car wheels and bumpers are far more serious than those usually produced by other means, which at first, to a person not experienced in the treatment of railway injuries, would appear similar.

An idea of the nature of the injuries, in 265 consecutive cases of railway injuries which have come under my care and treatment, is given by the following table:

Crushed fingers	Cases, 53, fingers, 80
" thumb	21
" hand	17
" forearm	18
" right forearm through elbow-joint, olecranon process crushed off, and injury to chest	1
" right forearm through elbow-joint	1
" toes	12
" foot and toes	7
" ankle	2
" thigh	11
Contused wound—shoulder	2
" knee	1
" thigh and back	2
" right hip and both legs	1
" thigh	3
" back	7
" hip	1
" inner side of thigh and perinaeum	1
" through perinaeum into bladder	1
" foot	1
Fracture—fingers	7
" metacarpus	4
" radius and ulna	2
" scapula, and injury to hip and abdomen	1
" scapula	3
" clavicle	2
" ribs	16
" sternum	1
" fibula	2
" fibula and astragalus	1
" tibia and fibula	8
" tibia, involving knee joint, compound	1
" patella	3
" innominate bone	1
" femur (both thighs), and dislocation dorsal vertebra	1
" tibia and fibula (compound), two ribs, and perforation diaphragm	1
" base of skull	3
" nasal and malar bones	1
" metatarsus	2
" tendon quadriceps extensor	1
Scalp wounds	14
Scalp wounds and contusion, back and shoulders	3

Scalp wounds and lacerated wound of leg	1
Lacerated wound, thigh and knee joint	1
Wounds of face	6
Squeezed through body and injury to kidney	1
Squeezed between bumpers, injury to bladder	1
Dislocation—shoulder, and fractured clavicle	1
" right ankle	1
" elbow, cut over eye, and concussion brain	1
Scalds by steam—face, head, and body	4
Scalds and burns of hands	2
Torpedo shot-wound, leg	2
Rupture right eye-ball and lacerated wound face	1
Radial artery cut off by broken glass	1
	265

The causes of injuries were as follows:

Fingers caught between draw-heads	31
Thumb caught between draw-heads	10
Fingers caught between bumpers	22
Thumb caught between bumpers	4
Hand caught between bumpers	9
Foot caught between bumpers	7
Ankle caught between bumpers	1
Toes run over by car wheels	1
Foot crushed by wheels	4
Leg crushed by wheels	7
Thigh crushed by wheels	6
Hand crushed by wheels	3
Arm crushed by wheels	8
Fell from top of car	5
from top of caboose	2
from top of cab	1
from engine	4
in manhole	2
across coal-board in tender	2
in culvert	2
in turn-table pit	1
from coal chute	3
from coal trestle	2
Bridge timber fell on foot	2
Unloading heavy machinery, fell on foot	1
Unloading barrel sugar, fell on foot	1
Face cut by glass	1

Radial artery cut by glass	1
Scald by water and steam from engine	4
Body caught between car and end of tie	1
Hand caught between end of tie and car	1
Leg caught under tie (unloading)	1
Body caught between bumpers	6
Elbow caught between bumpers	2
Arm caught between bumpers	9
Forearm caught between bumpers	19
Foot caught between pump plunger and cross-head	1
Foot caught in frog, and run over	2
Coupling, fingers caught by head of pin	8
Body caught between car and building	2
By cars going down bank	25
Hand-car ran off track and over	1
Car wheels ran over thighs while working under	2
Engine pushed over while working under	1
Engine ran in culvert	1
Struck by engine	8
Fireman, fingers crushed against door frame by coal	2
Jumping on and off switch engine	2
Crawling under cars in motion	1
Catching on moving trains	4
Jumped from top of box car	3
Stepped off car in motion	4
Head struck bridge	1
Fireman's poker caught in bridge	1
Eye struck by brake lever	1
Finger crushed by brake lever	2
Struck by pieces of torpedo	2
	265

This table does not include any which were immediately fatal.

AMPUTATIONS.

Fingers, 58; patients	41
Thumb	12
Hand	4
Forearm	12
Arm, upper third	10
Arm, at shoulder joint	2
Toes, 12; patients	7
Foot, at middle	3

Ankle joint	1
Leg, at middle	5
Leg, right and left foot	1
Legs, both at lower third	1
Thigh, lower third	3
Thigh, upper third	2
Thighs, both, upper third	1
Wrist joint	2
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These all resulted in recovery except four. One amputation of arm at upper third died of mental shock, added to the shock already produced by the injury, on the fifth day (this case was reported in a paper formerly read before this Association, on "Shock"). Another was an old man fifty-seven years of age, who had several car wheels pass over his right leg just below the middle, and a compound fracture of the left leg near the knee: he died of shock nine hours after the operation.

A strong, healthy car repairer was working under a car; other cars ran down against it, and pushed one wheel over his right thigh above the middle, and up on to the knee of the left, so that the joint was torn open. His condition seemed to warrant an amputation, and accordingly the right thigh was amputated at upper third, and the left dressed in racture-box. He seemed to be doing quite well three hours after the operation was completed; but suddenly the heart stopped beating.

A double synchronous amputation of both thighs, formerly reported in my paper on "Shock," died within an hour after the amputations.

The amputations were all immediate, except two, which were of the thigh,—one four weeks after the receipt of the injury, and the other, a re-amputation, after amputation of leg near knee over a year before, which was followed by osteo-myelitis.

It is not my intention to discuss the general field of amputations, but those necessitated by railway injuries. There

seems to be a question of doubt regarding the propriety of immediate operation after railway injuries, and I consider this a question of paramount importance.

In amputations after accident most authors divide the period in which the operation may be performed into the immediate, primary, and secondary. An immediate amputation is done during the prevalence of shock, and usually in from one to six hours after the receipt of the injury necessitating the operation; primary, after reaction from shock and before inflammation is established, usually within twenty-four hours after the injury; secondary, when performed after this limit and during the prevalence of inflammation. The danger of death after amputation depends chiefly upon the character of the injury and the location of the line of section. The prognosis becomes grave in proportion to the exhaustion of the patient as a result of the loss of blood, shock, sepsis, or of any dyscrasia or intercurrent disease. Amputations of the lower extremity are more fatal than those of the upper, and the nearer the line of section to the body the greater the danger.

Now as regards the best time to amputate after railway injuries: I have no doubt about immediate amputation being the safest and best in nearly every instance, where the surgeon is able to decide at once whether amputation will positively be necessary; and in a majority of railway cases there can be but little reason for doubt, as, when from one to a dozen car wheels, or the wheels of an engine, have passed over a limb, it is a plain case, and amputation is the only safe procedure; as, also, where a limb has been crushed between car bumpers. Where a limb has received such a crushing injury, and the circulation to the part beyond the injury is entirely cut off, and a large amount of tissue is crushed to a pulp, it is my opinion that every hour, beyond three or four, that the amputation is delayed increases the danger of blood poisoning, and increases the danger to the patient's life, as so much crushed or lacerated tissue as is cut off from the circulation immediately becomes dead; and decomposi-

tion very soon begins, and septic germs will be very liable to enter the circulation, and, after amputation has been performed, destroy the life of the patient. I know it is urged by many surgeons that we should wait for reaction to take place. There may be cases where this is the proper thing to do, but in a large majority of railway injuries it is waiting for septic poisoning and for the patient to die without surgical aid.

In many cases, waiting for reaction to take place is waiting for the shock already produced by the crushing wound to be aided by mental shock, which in many instances will produce death; while if, in place of waiting for reaction, an effort is made by the use of whiskey hypodermically and artificial heat, with hot sling internally, to assist nature in bringing about the much desired reaction,—which will, in nearly every case, manifest itself by rapid improvement in the circulation and in all symptoms, as soon as ether is administered,—in addition to the stimulating effect of the ether, we have relieved the case of the mental anxiety which always plays an important part in producing shock and keeping it up.

This was plainly shown by a brakeman, who had been injured four hours before I saw him, and who supposed he had only a fractured leg, produced by falling from a train in motion. His condition seemed good, and the pulse indicated no severe shock. His body was not cold; but when his clothing was removed, and it was found that his leg was crushed by the wheels passing over it at the middle, and he knew it must be amputated, he was immediately covered by a cold perspiration, with trembling of the body and limbs, and was nearly pulseless; but ether was at once administered, and his condition rapidly improved. Amputation was proceeded with, and after the operation was completed he seemed in much better condition than before, and made a rapid recovery.

I have noticed the same improvement, after severe injury, when ether was administered, in a large number of cases.

I believe that many patients are lost, after severe injuries

and operations, by neglecting to keep them surrounded by artificial heat, and the use of stimulants hypodermically, during and after operation. Until reaction is established, they should be closely watched, as many times they will appear to rally from the effects of the ether and be doing well, when suddenly, without warning, the heart ceases to beat.

As gangrene is the death of a part of the body from the general or sudden arrest of its nutrition, we should always be certain that the parts used for flaps in amputations have enough vitality left to maintain capillary circulation sufficient to keep them alive.

In amputations after railway injuries, the surgeon with but little experience in this class of cases is liable to let his anxiety to save as much of the limb as possible lead him to use for flaps tissues which have been so injured, and in which the capillary circulation is so feeble, that the entire flaps become gangrenous, and slough off, and have to heal by the tedious process of granulation, even if the bones do not ultimately protrude and require re-amputation.

Injuries of this class are very deceiving, as parts far above where external inspection indicates sound tissue are almost always so injured that in a few hours after the receipt of the injury the circulation ceases in the part, and soon forms a slough, including all the injured tissues; so, when practicable, the operator should be certain that none of this bruised or injured tissue is included in the flaps,—though there are cases, where the loss of an important joint is involved, when we are justified in using some of this tissue to help make up the flaps, preferring to have the flaps partly slough off and heal by granulation, to sacrificing the joint, as with proper antiseptic precautions a considerable amount of bruised tissue can be used as covering for granulations to spring up under; and though the part is dead and becomes discolored, it does not decompose and break down, as with the wet dressings formerly used, but dries, and serves as a harmless covering, until, in cases where the surface is not too large, the process of repair has gone on under it, and entirely healed over.

I can best illustrate the manner of operating and dressing which I prefer, by briefly reporting the details in the following case:

W., brakeman, aged 23 years, healthy appearing young man, December 7, 1887, about 5:45 A. M., was going over the top of freight train setting brakes, when his foot slipped, and he fell partly between two cars, and the wheels of six cars passed over his right leg and the great toe of his left foot.

He was brought to his home, and three hours after the receipt of the injury I first saw him, and found he had lost much blood, and had indications of considerable shock. He was very pale, and covered with clammy sweat; the pulse was very feeble and irregular. He said he knew that the wheels had crushed his leg and foot.

His body was wrapped in dry hot flannel blankets, he was placed in bed in a warm room, and bottles of hot water put around him. Hot whiskey sling was given liberally, and whiskey injected under the skin, and in less than half an hour there was marked improvement in his condition. Ether was then administered, which still improved the pulse, and the body and limbs became quite warm. On examination, it was found that the wheels had passed over the right leg at the lower third, and for four inches it was crushed to a pulp; the left great toe, and that side of the foot including the head of the first metatarsus, were crushed.

The hair was shaved from the leg, and it was thoroughly bathed with a very warm solution of bichloride, one part to two thousand. The left foot was also bathed with the same solution. A piece of one fourth inch rubber hose, twelve feet long, was tied to the bale of a pail, one end resting in the bottom. The pail was filled with hot water that had been boiled, and one part to three thousand of hyd. bichloridi added, and the pail suspended to the ceiling eight feet above the floor, the hose forming a siphon.

Esmarch's bandage was applied, and, with the catling, the anterior flap was formed from without inward, and the posterior by transfixion. The flaps were then turned back, and held by a tractor, which had been wet with bichloride solution, and the bones sawed through as nearly at the same time as possible, the crest of the tibia was slightly bevelled with the saw, a stream of water from the hose was applied by an assistant, and by this means the flaps were kept thoroughly cleansed, without touching a sponge to the cut surfaces.

The arteries were tied with juniper catgut, and the ends cut short; the Esmarch bandage was then removed, the stream of water was allowed to flow over the flaps until oozing had ceased and they were nicely glazed, and the toe of the left foot, to the middle of the tarsus removed, was

cleansed in the same manner; the flaps were brought together, and were sufficiently long to meet without the least stretching, and the edges of the skin came perfectly in apposition; then three deep sutures of catgut and numerous horsehair sutures were introduced to keep the flaps smoothly and perfectly together; the line of incision was then thickly covered by iodoform, and a piece of absorbent lint, covered by the same, placed over the whole stump, and smoothly covered by four layers of the same, extending to the knee, which were in turn held in place by a roller bandage.

Then a piece of lint as wide as from end of stump to knee, of sufficient length to go around under the limb, was fastened with safety-pins in front of the tibia; then a small stick passed through under the loop of lint, with strings at each end, tied to the arches of a bed cradle. This supported the muscles of the posterior side of the limb, and the flaps rounded up, allowing the tibia to settle down toward the centre of the stump, in place of having the heavy, muscular posterior flap dragging down and pressing the thin anterior flap against the sawed end of the tibia, as is usual in amputations of the leg. This apparatus can be applied by any surgeon, and is well represented in the cut, Fig. 1, which is

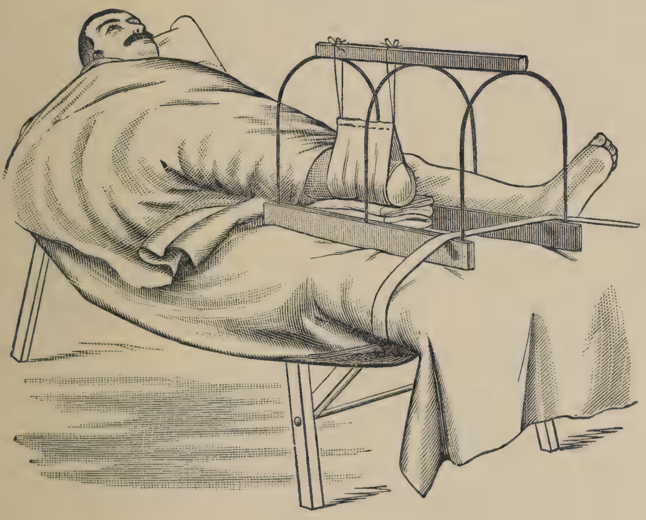

FIG. 1.

from a photograph of the patient just described. He rallied nicely after the ether, and had no pain, swelling, nor redness. The dressings were not removed until the fifth day. There was no discharge whatever, and

on the fourteenth day he was dismissed. At no time did the temperature rise above 99°. Figure 2 shows the stump, from a photograph taken October 3d.

Fig. 2.

The advantage of healing amputations by immediate union can hardly be estimated. Those of us who are much interested in obtaining the best results in every case must not forget the necessities on our part, not alone in using proper skill and judgment in operating, but in the closest attention to every detail, as regards perfect cleanliness, and modes of dressing wounds and amputations, and see to it that there is no neglect on our part, and, if possible, apply our dressings so as to obtain not only support, but as near absolute rest as the individual case will permit.

The circulation to the extremity of the flaps in amputations I have known to be obstructed by the application of adhesive strips, which defeated the object for which they were applied, and were the means of producing sloughing, which would not have occurred if they had not been used.

There can be nothing more gratifying to the surgeon than to be able to witness the completeness and perfectness of his work, whereby immediate union of the flaps takes place after an amputation,—when, without one drop of detected suppuration, the scar is so very faint and union so perfect that in place of the hard, thick, and semi-organised tissue of a large cicatrix, he can have the pleasure of seeing the smooth, tough, and elastic integument almost complete in its original integrity, and giving to the wearer of artificial limbs a useful and comfortable appliance instead of a painful and useless stump, as is many times the result where there is a large amount of cicatrical tissue, which, by the slightest injury or pressure, is liable to be converted into a chronic ulcer and a constant annoyance to the patient.

Of course it is more gratifying to the surgeon to save an injured limb than to amputate, though we frequently hear laymen giving the surgeon credit for "cutting off legs and arms for the fun of it." With perfect cleanliness, the removal of all foreign substances, modern dressings and appliances, and perfect quietude, many valuable limbs can be saved which would have been sacrificed under former plans of treatment. In this list of cases were many that were treated successfully, without amputation, which five or six years ago I would have believed impossible.

In one case, a brakeman, 19 years of age, was coupling, and his body was caught between the cars. He fell to the track insensible, and a car wheel passed over his right elbow, through the joint, producing a lacerated and contused wound six inches in length, the olecranon process being crushed off. The shock was so great, and of the insidious variety, that the injury was dressed without an anaesthetic, and he was apparently happy all through the operation, singing and joking

as the sutures were being introduced. The piece of bone was removed, the wound thoroughly cleansed with bichloride solution as hot as I could bear my hand in, and the tissues that were crushed removed with the scissors. It was found that the important vessels in the bend of the arm were intact; so the wound was closed, as well as the scanty amount of tissue would permit, and dressed with iodoform and absorbent lint. He recovered in three months, with some motion in the joint, and is now braking on a freight train.

Another case had his elbow crushed between the bumpers, which only caught the outer side of the arm, and it was shot out from between, so that the large vessels received no direct injury. The articulation was torn open, and there was an opening through the joint, giving passage to water when it was poured into the upper wound. This was dressed as in the former case, and made a good recovery, with motion of the joint nearly perfect, except rotation.

I shall not take more of your time reciting cases; but in closing wish to enter my protest against using air-tight dressings after amputations and in dressing wounds after injury. I refer to oil silk, rubber tissue, etc. By their use more harm than good is done in preventing evaporation of perspiration and moisture from the part: suppuration is more liable to take place than with light, porous dressings, made aseptic with bichloride and iodoform.

DISCUSSION.

Dr. T. H. Manley, of New York county, said, that while he greatly appreciated the paper for its fulness and exhaustive character, there were certain ideas and views advanced with which his experience did not justify him in agreeing. First, in regard to immediate amputations in railway injuries, or smashes, which will probably call for amputation. His experience was, that immediate amputation did not do well. A man is brought into the hospital either crushed, or run over, or having fallen, badly mangled, and suffering from shock. The only condition that would justify amputation until he had thoroughly reacted, was haemorrhage. If we could not control that without cutting deeply into the limb, the limb should be cut off. He had treated a large number of railroad cases,

mostly surface railroad cases. There was not a single instance where he did immediate amputation which was followed by death, that he did not regret it. He would certainly, in the future, not attempt amputation until the patient had reacted. There was another reason, namely, the difficulty of determining the extent of injury after a railroad accident by the appearance. After steam railroad accidents, in distinction from surface railroad accidents, there was nearly always a great deal more tissue destroyed than was apparent at first sight. There was generally more constitutional disturbance than after an accident caused by a surface road. Another reason why, in bad railroad injuries, he did not approve immediate amputation was, that, as had been said, we could not always estimate accurately and absolutely the extent of the injury, or determine at what point it was safe to operate without the risk of having to make a secondary amputation. There is nothing lost by waiting, if there be no haemorrhage.

He had done amputations, and used for flaps tissues that seemed perfectly healthy, and in twenty-four hours they were dead above the point of amputation. There were other reasons against immediate amputation, especially with children. As an illustration, a little boy six years old was run over, about four years ago, on a surface road. His tibia was smashed from the ankle to the knee, and the fibula broken in two places. The centre of the shaft of the tibia was crushed so that there was nothing left except the articulating extremities of the bone. The whole thing, when he saw it, was gathered up in a lump. At first sight it seemed preposterous to attempt to save the limb. There was some heat left in the foot. Shortly afterward the mother arrived, and would not listen to amputation. The boy's father was in Chicago, and if the leg must come off, it must not be done until his arrival. Finding considerable vitality in the foot, the limb was put in plaster of Paris dressing, fenestra being cut through. To-day the boy is walking on that foot without any support.

In another similar case, a boy was brought to the hospital with a compound fracture of the fibula in two places, and the whole limb badly mangled. The mother refused to allow amputation, and took the child home, but subsequently brought him back. Drawing the bones into position, Dr. Manley wired them with silver wire, drilling the shaft of the bone; and in less than three months the boy was walking on that leg very comfortably. The speaker entirely agreed with the view that impervious coverings of oiled silk, etc., were worthless, and wrong in principle. Though in theory they excluded germs, they excluded the air too, and he thought that a wound needed air just as much as healthy tissue did. It was often impossible to estimate how much flap we should leave to secure a good stump. It was hardly ever a mistake to leave a redundant flap.

Dr. E. M. Moore, of Monroe county, said that the introduction and growth of antiseptic surgery had a special application to railway injuries. He was in the position of the Dutch justice, who heard the pleas of both lawyers and came to the conclusion that they were both right. But they had failed to make a little distinction in the matter. Dr. Manley alluded to young persons. It had been his practice for a long time to save everything where a boy was concerned. The same sort of treatment could not be applied to a man fifty years old. There was a great difference in the vascularity. Moreover, any one would be willing to have his child run some risk of his life for the sake of saving his limb through the long period he had to live. One thing is to be borne in mind, even in the adult, and that is the amount of circulation in the part beyond. Nearly forty years ago he was called to see a man working in a country mill, where there is so much shaking of machinery, whose arm was carried through between broad cog wheels, and nearly pulled apart. He did not see the man until the next morning, when he was sent for to amputate the limb. He found the pulse at the wrist beating full and free, and advised against amputation. The bone was crushed all through, and yet the elastic vessel had escaped. Three months afterward the poor fellow came in and thanked him for his arm. The idea of amputating the foot with the pulse beating, no matter how much the bone was crushed, he never entertained, even in the days of old surgery when we put it into a box with the bran dressing; but with the modern surgery of to-day, with the antiseptic power of bi-chloride, it should not be thought of. His custom had been to carry out, with boys, the ideas Dr. Manley suggested. As had been said, we could not tell how much tissue was destroyed. He had had them brought in with the foot all crushed. He put such feet into warm water until nature told where the dividing line was. He did not agree with Dr. Manley in another particular, but did agree with Dr. Brown,—that the amputation in these tremendous injuries, where railroad cars ran over the limb, must be made at once. Patients would die with the limb torn to pieces, especially if the knee joint were open, nineteen times out of twenty; but we could save some. The common custom of saturating the man with whiskey was a pretty good one. In these cases, he found that when they began the administration of ether, preparatory to operation, the pulse of the patient would improve even while the operation was being performed. The ether would enable the whiskey to farther narcotise and have its full power and effect. It would also directly abate the irritation of the nerves, which we call shock. He had operated before ether or chloroform was discovered. His first operation was upon an arm, and he recollected it as though it were yesterday. The patient was a farmer, thirty years of age, whose arm was caught in a threshing-machine and fearfully lacerated up to the elbow, all the tendons and muscles being stripped out. It is well known that in lacerations of the

superior extremity, the prostration and shock are not so great as in the inferior extremity. When he uncovered the arm, it needed no second opinion to decide that the arm was to be cut off above the elbow. He put on the tourniquet, and passed the knife through, making a double flap. Not a word was said and not a groan uttered. The work was just done, and he was about putting on the dressing, when the man looked at him and said, "You have no idea how much better that feels."

His experience in railroad accidents was, that the knife must follow the accident as soon as possible. Give the man stimulants, give him ether, and give him the knife.

On the subject of antiseptic surgery, he had said that his custom had been to put these limbs in warm water, which was a pretty good antiseptic itself. He found that at the end of a week nature determined the whole question, the dead part not having the ordinary appearance of gangrene.

Two months ago a man was brought in with a railroad injury, the car having run over his leg. There was no question about the necessity of amputation. The injury was half way up the leg, and the difficulty was in reference to the flaps. The skin was torn entirely loose. Never before the days of asepsis would he have thought of retaining the flaps under such circumstances; but he determined to make the effort, and dressed the wound with strict antiseptic precautions, putting on the oiled silk covering. The man rallied readily, and went on very well day after day, with scarcely any elevation of temperature, and at the end of ten days he removed the dressing, under a bi-chloride spray, and found, just as he had supposed, that the flap was dead; but it did not stink. There was no gangrene, in the sense in which we use the term. It looked like deep ecchymosis. The man was suffering no inconvenience. He proceeded to amputate the thigh, put on the antiseptic dressings, and let them stay there for three weeks without disturbing them. He found the wound healed with the beautiful scar that is characteristic of antiseptic surgery, and the man began to use his crutches at once.

He had observed one thing in reference to the bi-chloride, when used warm, that he had not seen mentioned anywhere,—that was, its anaesthetic power. The ordinary pain of a cut was almost abolished.

Dr. Brown was glad to hear so good an authority as Dr. Moore agreeing with some of the points he expected to find opposed by other surgeons. One of the reasons he had for giving his views on the subject was to elicit discussion, and, possibly, to establish some better plans of treatment. As had been seen, surgeons of large experience differed widely on the point of immediate amputation. His experience applied mostly to railway employés. He did not believe that a limb could be saved after car wheels had passed over it. He did not think that waiting for the flap to discolor should be entertained for a moment. He believed that more patients would be saved by amputation than by waiting.

DISCUSSION ON TUMORS.

REMARKS INTRODUCTORY TO A DISCUSSION ON TUMORS FROM A SURGICAL POINT OF VIEW.

By John W. S. Gouley, M. D., of New York County.

October 10, 1888.

For many years past the importance of periodically examining the question of tumor formation in the human body has been fully recognised by physicians and surgeons, as shown by the reports of discussions, by special articles, and by treatises on tumors that appear at home and abroad. In such examinations it is sought to render available the advances made from year to year in pathogeny, to incorporate into the nomenclature all proper changes of terms, and to rearrange, in some cases, the species and varieties. The outcome of these periodical revisions is the enlargement of the field of view respecting tumors, together with the adoption of improved methods of treatment by which substantial benefits are conferred upon sufferers. The subject is not likely to be exhausted for many generations; it is always before the profession and often before the people, especially when some eminent personage is affected with malignant disease. The laity then ask, What is a tumor? Is it the same as a cancer? Has a cancer spreading roots like the claws of a crab, from which it is said to derive its name?—while many individuals gravely assert that X is suffering from a cancer and not a tumor, or from a tumor and not a cancer. It is not easy to convince certain non-medical persons that a tumor means nothing more than a swelling, and that this swelling may be benign and never return after it is cut, or may be cancerous, malignant; that beside cancers, there are other tumors which

are malignant; that there are tumors which, though benign in structure, may imperil life by their liability to bleed excessively, or by their interference with vital functions; and that there are tumors which may be infectious, glandular, or cystic.

The term tumor is here used to signify a swelling in any part of the body, exclusive of tumefactions arising from inflammatory action, contusions, wounds, fractures, luxations, aneurysms, etc. In accordance with this view, the tumors may be arranged into four classes, as follows: Class I, Neoplasmata; Class II, Adenomata; Class III, Blastomata; Class IV, Cystomata.

For the present, the first class only will be considered.

The term neoplasma, meaning literally a new formation, was long ago used, for the sake of greater precision, by Burdach, and adopted by other pathologists, as the name of the class of new formations in the human body arising from simple division or from endogenous multiplication of preëxisting cells. It is applicable to certain benign as well as to malignant tumors, but not to adenomata, granulation growths, or cysts.

The reason for regarding these tumors as new formations is, that they are developed independently of the matrix tissue by which they are surrounded, and that they act as independent bodies, and bear no relative increase or decrease of size with, though they derive their sustenance from, the organism. They differ in their development from the matrix tissue, and their histogenesis is very unlike the formative processes originating in inflammation. Many of the neoplasmata occur at all ages: they begin in apparently normal tissues, and are due to the persistence of embryonic germinal tissues in the otherwise mature organism, taking their rise in what may be called belated rudiments,—foci of embryonic tissue which have not been utilised in elaborating normal tissues, and so have lingered on unchanged. In other words, such growths are atypical new formations, starting in latent embryonic rudiments. The germs of the growths may be very

small and elude observation, being embryonic cells, or may be quite recognisable among the normal elements. These germs may long remain inactive; but when external conditions, supply of nutriment, and relation with surrounding tissues are favorable, they begin to multiply, start into new life, and form neoplasmata. The blood-vessels of neoplasmata deviate markedly from blood-vessels of normal tissues. Their parietes are very thin in tumors of low organisation, and of nearly natural thickness in tumors of high organisation. Lymph-vessels abound in tumors, and have been found to communicate with cancer alveoli. Such, in brief, are the views of Hasse, Cohnheim, Lancereaux, and other pathologists.

Clinical observation, supplemented by microscopical examination, has established the fact that neoplasmata of high organisation are benign, while those of low organisation are malignant, and that the lower the organisation the greater the malignancy. For instance, among the epithelial neoplasmata the medullary carcinomata are the most malignant, being of the lowest organisation; and among the endothelial neoplasmata the round-celled sarcomata are the most malignant, being of the lowest organisation.

Several modern authors classify neoplasmata clinically, or rather prognostically,—that is to say, into benign and malignant tumors. Classification on such a basis is confusing and unsatisfactory, partly because varieties of certain species of benign neoplasmata, being often malignant, become so widely separated from their species that they cannot be advantageously studied. Other authors endeavor to classify them on the basis of Müller's law, and also on the blastodermic theory, but with little consistency. The authors who adopt the view of His in regard to the blastodermic theory, arrange certain neoplasmata into those of archiblastic and those of parablastic origin, the archiblastic being the epithelial and the parablastic the endothelial (connective-tissue) neoplasmata. The law of Müller and the blastodermic theory are both of very great service in the study of neoplasmata, but

neither affords sufficient amplitude to stand as a basis for nomenclature and classification. It is only anatomy—not merely as anthropotomy, but in its wider sense of anthropos-ophy—that has the requisite breadth for this foundation, since, in the sense in which it is here used, it comprises embryology, physiology, histology, and all that is essential to the knowledge of man, in a state of health, without which it is not possible to have a correct conception of any departure from this state of health. The advantages of this broad basis are such that it deserves to be more closely and consistently adhered to than it has been by most of the investigators and teachers.

A fair knowledge of the anatomy, physiology, histology, and pathology of vegetables, as well as of the lower animals, cannot fail to be of great value as a preliminary to the right understanding of the diseases of man, and very particularly of tumors, which are known to occur so frequently in the vegetable kingdom and among the lower animals.

In case of a rigid adherence to the anatomical basis of nomenclature, the following simple rules may serve to guide the nomenclator:

1. The ordinal names of neoplasmata should accord with the names of the types of tissues to which their substance belongs—*e. g.*, epithelial neoplasmata, endothelial (connective-tissue) neoplasmata, muscle-tissue neoplasmata, nerve-tissue neoplasmata, vessel-tissue neoplasmata.

2. The generic names of neoplasmata should accord with the name of the particular tissue of which, respectively, they are chiefly composed—*e. g.*, myxoma, inoma, chondroma, osteoma, etc.

3. The specific names of neoplasmata should be the same as the generic names with the affixion of the special character of the tissue entering into their composition—*e. g.*, round-celled sarcoma, spindle-celled sarcoma, giant-celled sarcoma.

Some of the generic and specific names of neoplasmata are objectionable by reason of their failing to convey a correct notion of the histogenic characters of the growths which they

are intended to designate. Among the most inaccurate are carcinoma and sarcoma. The first name has nothing in common with a polymorpho-cellular epithelioma, and the second was given by Abernethy to a genus with eight species of tumors having a "fleshy feel," in contradistinction from cartilaginous and osseous tumors. This term was afterward adopted by Virchow and Cornil and Ranvier for a genus of the connective-tissue neoplasmata. Strictly, sarcoma can never have any other meaning than that of a fleshy tumor. Therefore, in keeping with the anatomical nomenclature, a more significant name should be given to this genus. Granting that epithelioma is of epithelial origin, and that sarcoma is of endothelial origin, why, then, in accordance with its origin, should not endothelioma be used instead of sarcoma to designate the genus of lowest grade of the connective-tissue neoplasmata, placing as a species of this genus the growth now known by the name of endothelioma? But, unfortunately, the terms epithelium and endothelium are not of the best. These questions are submitted to the patho-histologists for consideration, in the hope that they will soon critically examine the terms carcinoma, sarcoma, and other equally inappropriate names.

4. The varieties should bear the names of their species with the affixion of the name of the substance which is superadded—*e. g.*, globo-cellular *myxo*-sarcoma, fuso-cellular *ino*-sarcoma, giganto-cellular *osteo*-sarcoma, and so on with *chondro-*, *lipo-*, *neuroglio-*, *lympho-*, etc.

5. The sub-varieties should bear the names of the varieties with the affixion of characters which are common to the varieties of different species—*e. g.*, *telangiectatic* globo-cellular myxo-sarcoma, telangiectasis occurring in many varieties of tumors.

Nomenclature and classification provisionally constructed on such a plan must necessarily be helpful in a high degree to the right understanding of the nature of the different neoplasmata, beside rendering their study less laborious than heretofore, and constantly suggesting improvements.

But the subject is too large to be disposed of in a limited essay, and it would not be wise, on an occasion like this, to undertake more than its general consideration. The special investigation of its divisions and sub-divisions should be reserved for future debates, and only the most salient points of theoretical and practical value should be introduced in order to elicit in brief the views of the Fellows and the judgment of the Association.

To this end the following questions are propounded:

Question 1. What are neoplasmata, and what are the characters which differentiate them from blastomata, and these from inflammatory processes?

Question 2. What are the advantages of naming and arranging the neoplasmata in accordance with their histogenesis?

Question 3. What is the value of the anatomical basis to the clinician when the question of malignity arises?

Question 4. What are the objections to the grouping of neoplasmata in accordance with benignity and malignity?

Question 5. What constitutes malignity histologically and clinically?

Question 6. What is the mechanism of the necrotic process which so often occurs in certain neoplasmata?

Question 7. What is the rationale of the recurrence of excised neoplasmata in distant parts or in the viscera?

Question 8. What is the explanation of the tendency in certain neoplasmata to involve secondarily neighboring lymphatic ganglia?

Question 9. What therapeutic deductions are to be drawn from the analysis of the genesis and history of a given neoplasma?

Question 10. What are the indications and contra-indications of the excision of neoplasmata?

Question 11. What is the average duration of life from the time of the appearance of malignant neoplasmata which have not been treated?

Question 12. To what extent does the excision of malignant neoplasmata prolong life?

Question 13. Are malignant neoplasmata ever cured?

Question 14. What is the rate of mortality from malignant neoplasmata, as compared with other diseases?

In this introduction to the discussion it is not proposed to examine all the preceding questions, but to request each debater to answer one or several questions, and all the debaters to answer the thirteenth question, and finally to ask their opinions, particularly on the questions relating to bedside diagnosis, to malignity and its degrees, to prognosis as affected by the seat of the disease, to surgical and medicinal treatment, to recurrence after ablation, and to curability of malignant neoplasmata.

As pertinent to the question of malignity of some of the neoplasmata, the following point will be briefly considered: Until the latter part of the last century it was believed that all tumors were at first benign, and that some of them degenerated into malignant disease through the intervention of a humor. Though it was then shown that this ancient theory of degeneration would not bear close examination, as it was discovered that many tumors were malignant from their beginning, and that others were benign and remained so, still the belief in humoral degeneration continued until the dawn of patho-anatomy; and, notwithstanding the advances made by Abernethy and Laennec, and subsequently by those who developed the cell doctrine, there has long lingered in the minds of many physicians a vague notion of some mysterious kind of degeneration of benign into malignant tumors.

The modern doctrine of metaplasia has since given its aid toward the solution of the question, Is there such a condition as the metamorphosis of benign into malignant tumors?

Retrogressive metaplasia in tumors indicates malignity, progressive metaplasia toward higher organisation being a movement in the direction of benignity.

By the aid of this doctrine certain changes in the structure of neoplasmata, ill understood before, can now be accounted for, but metaplasia is most probably one of the ways, and not the only way, to explain these changes. However, there are

patho-histologists who declare that benign are transformed into malignant tumors *always* by reversion of their cells to lower forms of cells. It is clear that only a certain proportion, and not all of the cellular element of a benign growth which has become malignant, is characteristic of malignity, otherwise there would be no mixed growths, such as sarco-inoma, sarco-lipoma, etc. Is it not likely, also, that, after some local disturbance, benign growths become malignant by an accession of newly proliferated embryonic cells, and therefore, in this case, without the intervention of retrogressive metaplasia of their highly organised cells? In the varieties of these growths there is sometimes only a small proportion of the malignant element, the benign element remaining intact. In accordance with this view of the metamorphosis of new-growths, it may be said that benign are not liable to be wholly metamorphosed into malignant growths. One element or another may at some time enter into the composition of a growth, and may become preponderant without entirely destroying the primary element. In this way, then, and not always by retrogressive metaplasia, benign growths may become malignant. New-growths are developed by the proliferation of embryonic cells which exist in the interstices of normal tissues, and not ordinarily by retrogressive metaplasia of these tissues. The degree of malignancy is proportionate to the state of organisation of the cells: the lower the organisation of these cells, the greater the malignancy, the most highly organised being those of benign growths. Whatever substance may be superadded to a tumor, even if the intruder should in time exceed it in bulk, the original element is traceable in the general mass of disease. If this were not the case, a cancer, by progressive metaplasia, would become benign, and how fortunate would be such a circumstance! But a cancer remains a cancer, a sarcoma is always a sarcoma, though it contain bone, cartilage, fibrous tissue, etc. A lipoma is always a lipoma, though a malignant element be superadded. Thus, an inoma may become malignant by the superaddition of the sarcomatous element; it is then a sarco-

inoma, an ino-sarcoma being a sarcoma some of whose cells may have undergone progressive metaplasia;—and a lipoma may have received an accession of the sarcomatous element and so become malignant; it is then a sarco-lipoma, a lipo-sarcoma being a sarcoma some of whose cells have been transformed into fat cells.

From warty excrescences that have existed many years upon the faces of elderly persons, epitheliomata have been known to develop. This may, however, take place by retrogressive metaplasia, but not necessarily in every case.

A sufferer may be affected with benign and malignant neoplasmata at the same time, and some of the benign growths may become infected with the malignant element either by retrogressive metaplasia or by an accession of newly proliferated embryonic cells. The infected growths are worsted by the retrogression or the superaddition, but the whole of their structure is not necessarily transformed.

A new-growth may have had all the clinical characters of benignity for a long time—five, ten, fifteen, or twenty years—and then, possibly after the infliction of a slight injury to the part, or even without injury, rapidly increase in size, and progress as a most malignant affection; and this is as likely to be owing to an accession of newly proliferated cells of low organisation as to retrogressive metaplasia. Sarcomata and carcinomata sometimes take this course. Therefore during their period of inaction they should be excised.

The general histogenic characters of malignity of tumors having been stated, a few words may now be said in reference to some of the clinical characters of malignity. A tumor is said to be malignant when its growth is rapid; when it exhibits a strong tendency to ulcerate; when the disease invades surrounding tissues; when it propagates itself through the lymphatics to distant parts and to the viscera; when it generalises itself, infects the whole organism, and finally destroys the patient; or when, after complete excision, it recurs. These are the principal clinical characteristics of malignant tumors. Benign tumors sometimes recu

after excision, but in malignant tumors the tendency to recurrence is constant. Some of the benign tumors are prone to necrosis, but all the malignant tumors have this tendency in a most marked degree.

A statement of the gross anatomical characters would here be out of place.

In the case of an incomplete excision of a malignant tumor, even if the smallest particle of the disease be left behind, the cells continue to multiply, and in a short time the growth attains its former dimensions. This cannot well be regarded as a recurrence of the tumor, but as its continuation.

When newly formed tumors occur in the lymphatic ganglia, distant parts, or viscera, a few months after the excision of the original growth, it is fair, as a general rule, to look upon them as metastatic, the metastasis having occurred, perhaps, only shortly before the operation. However, the recurrence of malignant tumors may take place in these several parts without metastasis, in a few months or many years after the operation.

The only true recurrence, then, is in the case of the sprouting of an entirely new formation, in the site of a completely excised tumor or elsewhere, a few months or many years after the operation.

Much preliminary study will be required before any attempt can be made to give a satisfactory answer to Question 11, *What is the average duration of life from the time of the appearance of malignant neoplasmata which have not been treated?* In endeavoring to obtain the information necessary to the accomplishment of this desired end, nothing less than the analysis of many thousands of well recorded cases should be undertaken. The opinions of different authors on this question, though in several instances based upon the study of hundreds of cases, would doubtless be greatly modified by the examination of thousands instead of hundreds of cases. The subject needs to be reopened and investigated, with the purpose of ascertaining the average duration of malignant neoplasmata of different orders separately.

A contribution toward the answer of Questions 12 and 13 is now offered.

Though, in the majority of instances, the recurrence of malignant neoplasmata after excision is speedy—the disease soon generalising itself, invading vital parts, and leading to a fatal issue in less than three years—it sometimes happens that they do not recur for many years after excision. It is believed by surgeons of much experience that long periods of immunity are more common than they are ordinarily supposed to be. It is therefore important that this question be freely discussed, and that an endeavor be made to determine if it can be answered with a measurable degree of accuracy. Prolonged immunity is doubtless often owing to early and thorough eradication of the growth before certain well known symptoms have manifested themselves; but this immunity has occasionally been observed even in cases where the neighboring lymphatic ganglia had already participated in the disease.

The following cases are cited in illustration of immunity for periods varying from seven to forty years after the excision of different species of neoplasmata known to be malignant. In the statement of these cases the old nomenclature is employed in most instances:

CASE I. *Epithelioma of the Right Wing of the Nose; Excision and Cauterization with the Thermo-Cautery; no Recurrence in Seven Years.*—H. H., sixty years of age, who had for two years been inconvenienced by an epithelioma, one centimetre in diameter, above the right wing of the nose, applied for treatment in the month of August, 1881. An operation was advised and forthwith performed. The integument was incised at a point two millimetres beyond the limit of induration, encircling the growth, which was dissected from its bed. The whole denuded surface, together with two millimetres of peripheral sound skin, was then cauterized with the thermo-cautery of Paquelin, and a layer of dry cotton was applied as the only dressing. The diagnosis was confirmed by a microscopical examination of the excised growth. Cicatrization was complete in three weeks without deformity. Seven years and two months have elapsed since the operation, and there is no sign of recurrence of the disease.

CASE II. *Epithelioma of the Lip; Excision; Recurrence in Eight Years.* P. J., about fifty years of age, presented himself at the college clinic, suffering from an epithelioma of the lower lip, which had developed itself only a few months before, and already involved the greater part of the left cheek and the neighboring lymphatic ganglia. Operative interference was deemed inadvisable, and the patient never returned. Eight years prior to the appearance of the growth which destroyed him, an epithelioma had been successfully removed from his lip, and he had been in good health during the intervening period.

CASE III. *Epithelioma of the Lip; Recurrence Sixteen Years after its Excision.*—On the same day and during the same hour M. H., almost the counterpart of Case II, presented himself at the clinic, but, instead of eight years, he had been operated upon sixteen years anteriorly for a labial epithelioma, and was five years older than P. J. The disease had recurred, as in the case of P. J., a few months before, and was so far advanced as to forbid an operation. How long he lived after this was not learned.

CASE IV.—*Scirrhous Cancer of the Breast; Excision; No Recurrence in Thirteen Years.*—The following is an extract of a letter lately received from Dr. Alfred L. Carroll, respecting a case of mammary cancer operated upon by him: "As regards the case which I mentioned to you . . . it occurred, in 1857 or 1858, in the person of a lady, aged about forty-five, from whom I removed a scirrhous cancer of the mamma. You examined a part of the specimen after removal, and agreed with me as to the unquestionable character of the neoplasm. The adjacent lymphatic glands were not involved. I heard of, and occasionally saw, the patient for nearly thirteen years afterward, during which time there had been no sign of recurrence or secondary infection. After that time she passed from my observation."

CASE V. *Scirrhous Cancer of the Breast; Excision; Recurrence in Twenty Years, when a Second Operation was performed, and followed by Cauterization of the Wound; no Recurrence in Three Years and Eight Months.*—A single lady, fifty-two years of age, came to seek advice on account of two livid, hard, and painful growths, an inch and a half in mean diameter, respectively, which had sprung from a scar resulting from the excision of her left mamma for a scirrhous cancer twenty years before. Extirpation of these new-growths was advised and executed on the 29th of January, 1885, and the whole wound, whose dimensions were four by six inches, together with half an inch of the surrounding integument, was cauterized with the thermo-cautery, and a dressing of dry cotton was applied.

The microscopical examination of both growths showed them to be cancerous. The fibrous stroma was very abundant, and cells of different forms were contained in characteristic alveoli.

The wound was healed in four weeks, and the disease has, so far, shown no tendency to recur.

CASE VI. *Scirrhous Cancer of the Breast; Excision; no Recurrence in Twenty-four Years.*—A cancerous female breast, excised by Dr. John J. Crane, was sent for examination on the day of the operation. The diseased mass exhibited the gross as well as the microscopical characters of what is ordinarily called scirrhous cancer. The wound soon healed, leaving no trace of the original disease, the adjacent lymphatic ganglia not being involved. Twenty-four years after the operation, Dr. Crane reported the patient as in excellent health, and free from any sign of malignant disease.

CASE VII. *Cancerous Tumor; Excision; Recurrence in Thirty Years.*—Dr. Verneuil, of Paris, mentions "the case of a lady from whom he had removed a tumor, which was examined after the operation and pronounced to be cancerous. Thirty years afterward the disease recurred in the scar, and was again extirpated. The microscopic examination completely confirmed the former diagnosis." ("British Medical Journal," April 7, 1888.)

CASE VIII. *Scirrhous Cancer of the Breast; Recurrence Twenty-five Years after Excision, when a Second Operation was performed, the Patient Dying in Five Years without Sign of Recurrence.*—Mrs. McB., at the age of fifty, was suffering from a scirrhous cancer of the left breast, which was excised by Dr. Bushe. She remained free from cancer for twenty-five years, when the disease recurred in the scar. Dr. Alexander B. Mott, who relates the case, then took charge of her and excised the new growth, which was of the size of a hen's egg. She died, aged eighty, five years after the second operation, without having shown any farther sign of cancerous disease. A daughter of this lady is said to have died of cancer of the breast.

CASE IX. *Scirrhous Cancer of the Breast; Recurrence Twenty Years after Excision, then Two Years after a Second Operation, and again Twelve Years after a Third Operation; no Recurrence Three Years after a Fourth Operation.*—In the year 1850, Dr. Valentine Mott excised the cancerous mamma of a woman aged forty years. The wound healed rapidly, and there was no recurrence of the disease until 1870, when a small growth appeared in the scar, and was removed by Dr. A. B. Mott. Again, in 1872, the doctor excised from the scar a growth similar to the first. There then followed a period of immunity of twelve years. In 1884 a third small growth was excised by Dr. Mott. The patient was last seen in 1887, and, though seventy-seven years of age, was in good health and free from any sign of malignant disease.

CASE X. *Scirrhous Cancer of Both Breasts; Excision; Recurrence in the Lungs Forty Years after the Operation.*—In the year 1858, a surgeon of large experience related the case of a woman, both of whose mammary

glands had been excised for scirrhous cancer, who remained in good health until forty years after the operation, when she died of cancer of the lungs, as verified by an autopsy.

CASE XI. *Giant-celled Sarcoma of the Right Mamma of Eleven Years' Standing; Excision; Recurrence in Eight Years; a Second Operation; no Recurrence in Six Years.*—Mrs. J. W., fifty-five years of age, was first seen on the 4th of May, 1874, in consultation with Dr. E. F. Preston, of Suffolk county, New York. She received in 1862 a slight blow upon the right breast. One year after this she noticed in this breast a hard but painless tumor, half an inch in diameter, which in eight years increased to three inches in diameter, and became painful. Thenceforth it grew slowly until 1871; afterward its increase was more rapid, particularly in 1873, and when she called with Dr. Preston the tumor measured twenty-seven inches in its greatest circumference. The superficial veins were considerably enlarged. She was in apparently good health, though she suffered pain in the diseased breast, partly owing to its weight.

The operation of excision of the breast was performed on the 9th of May, 1874. An elastic bandage was snugly applied, and an India-rubber cord then tightly drawn around the base of the tumor to control haemorrhage, according to Esmarch's method, and the entire mamma quickly removed. The wound was then covered with a folded towel and compressed by the two hands of an assistant, who exposed for ligature only two or three bleeding vessels at a time, until thirty were tied. By this precaution the loss of blood was not in excess of eight ounces during the whole operation. The lips of the wound were stitched, and adhesive strips applied, together with other necessary dressings.

The tumor, almost entirely deprived of its blood by the elastic compression, weighed nine pounds, and proved, on microscopical examination, to be a giant-celled sarcoma. The sutures were removed on the fourth day, half of the wound having healed primarily. On the eighth day all but two of the ligatures came out. The remainder of the wound cicatrized rapidly, and the patient made a good recovery.

Fourteen years have elapsed since the operation.

Desiring to know the present condition of the patient, a letter of inquiry was addressed, on the 21st of April, 1888, to Dr. Preston, who replied as follows:

Mrs. J. W. recovered nicely from your operation, and improved very much in her general health afterward. On the 8th of June, 1882, I removed another tumor, about the size of a goose-egg, similar to the previous one, situated in the upper portion of the chest, on the right side, not in the old cicatrix, nor very near it; indeed, the upper border of the tumor was only an inch or two below the clavicle . . . . quite near

the sternum. From this operation she recovered rapidly and satisfactorily. No farther recurrence has taken place. . . . She is now very well, . . . sixty-nine years of age, . . . and engages every day in her usual duties.

The period of immunity after excision, in the above cited eleven cases of malignant growths, averages a fraction over nineteen years.

In three cases there was no recurrence.

In seven cases, the disease recurred once in each, as follows: In eight, eight, sixteen, twenty, twenty-five, thirty, and forty years.

In one case, the disease recurred three times. The first recurrence was twenty years after the operation; the second, two years after the second operation, when there followed a period of immunity of twelve years; a small growth then appeared, which rendered the fourth operation necessary. The patient was living and well three years after the fourth, and thirty-seven years after the original, operation.

Three cases are still under observation.

In one of these cases there was no recurrence seven years and three months after the operation.

In one case the disease recurred in twenty years, when a second operation was performed. There was no farther recurrence in three years and eight months.

In one case the disease recurred in eight years, when a second operation was performed. Six years and three months afterward there was no sign of farther recurrence.

Those surgeons who have not lost sight of all their cases after operation can doubtless give similar accounts of long periods of immunity after the excision of malignant neoplasmata, although the reverse of long periods of immunity seems to be the rule. The exceptions are, however, more numerous than ordinarily believed.

According to Gross, the ablation of breast cancer is followed by "permanent recovery" in 9.05 per cent. of all cases. The period assigned by him as characterizing such recovery is "over three years."

It will be seen below that Cazin's estimate is 12.6 per cent. "permanent cures," and that he assigns over seven years as the period characterized by him as "permanent cure."

In an analysis of 519 cases of ablation of breast cancers, Gross states that 43 of these 519 cases "were still living, and 4 had died. Of these 47 cases, recurrent growths were removed in six, and there was freedom from disease after the last operation" in 32 cases for between three years and two months to six years; in 7 cases, for between seven years to nine years and six months; and in 8 cases, for between ten years and one month to fifteen years and seven months. In these cases, he says, "the average time of cure was five years and nine months, and the disease had existed before the operation, on an average, for eighteen months and four tenths."

The following, abstracted from the "British Medical Journal," April 7, 1888, shows results of much interest, and the analysis of a great number of cases of tumors, serving as an additional illustration of the question of immunity after operation:

At the late meeting of the French Surgical Congress the question of recurrence of malignant growths after extirpation was discussed by Dr. Cazin, Dr. Verneuil, Dr. Labbé, Dr. Mollière, and others. Dr. Cazin, in introducing the subject, gave a summary of 564 excisions of tumors performed by himself during a period of twenty-four years. Among these tumors were myxomata, chondromata, and sarcomata, beside true cancerous growths. In 102 cases of scirrhous cancer of the breast, there was secondary glandular affection in 60;—of these, 7 were permanently cured, in 48 recurrence took place, 3 died, and in 2 the result was unknown. Among the remaining 42 cases in which the glands were unaffected, there were 8 cures, 28 recurrences, 2 deaths, and 5 that were lost sight of. In 120 cases of encephaloid cancer the glands were involved in 80;—of these, 5 were cured, in 67 the disease returned, 4 died, and 4 could not be traced. Of the remaining 40 cases, in which there was no glandular affection, 8 were cured. Thus, in a total of 222 cases, there were 28, or 12.6 per cent., permanent cures. The cases of scirrhous cancer, viewed separately, give a total of 15 cures, or 14.7 per cent.; but, of those in which the glands were affected, only 7 out of 60, or 11.66 per cent., were cured, while of the others, in which the disease was limited to the breast, permanent cure was obtained in 8 out of 42, or a fraction over 19 per cent.

Among the 120 cases of encephaloid cancer, 13, or 10.8 per cent., were cured; but of the 80, in which the glands were involved, the proportion of cures was only 5, or 6.25 per cent., while of the 40, in which there was no glandular enlargement, no fewer than 8, or 20 per cent., were cured. In the cases in which recurrence took place, the disease returned in from three months to seven years after the operation. . . . Dr. Cazin attributes his success to the freedom with which he removes apparently healthy tissues surrounding the growth, and to the care with which he seeks for and removes not only diseased glands, but the lymphatics between them and the tumor. He is not content with exploring the axilla, but makes minute search in the subclavicular region, behind the clavicle, and in the supra-clavicular fossa.

Dr. Verneuil strongly favors medicinal treatment after the excision of malignant growths, while the morbid process is in abeyance, and advises a prolonged course of alkaline medication, such as may be obtained by the use of Vichy water, magnesia, etc., together with arsenic, with a view of neutralising the gouty diathesis, which he believes to be the predisposing cause of cancer.

Dr. Mollière, of Lyons, thinks that the great point to attend to in estimating the probability of recurrence is the patient's age. If he be young, the disease is so certain to return that he doubts if it is worth while to operate; after fifty, there is a fair chance that recurrence may not take place; after seventy, it is almost certain that the patient will remain free from the disease.

According to Dr. Cazin's summary, the period of recurrence of malignant neoplasmata after excision ranges from the minimum of three months to the maximum of seven years, for he says of his cases, "in which recurrence took place," that "the disease returned in from three months to seven years." Therefore his twenty-eight cases were declared cured presumably only after seven years.

In view of the fact that malignant growths have been known to recur twenty, thirty, and even forty years after excision, it is scarcely safe to speak of permanent cures. The proportion of "permanent cures," or strictly of long periods of immunity, in Dr. Cazin's cases—12.6 per cent.—will strike most surgeons as an excellent exhibit when they take into consideration that in twelve of the twenty-eight "cures" there was glandular involvement, and that thirteen of these twenty-eight cases were of encephaloid cancer. In the sum-

mary of Dr. Cazin's cases, published in the "British Medical Journal," it is not stated how long he kept watch upon his "cured" cases. The question of cure is not so easily disposed of as it might seem at first sight. It does not appear that Dr. Cazin uses the term cure to signify immunity from the disease for many years, since in certain places he qualifies the term by the adjective permanent. The word cure is ordinarily employed to signify restoration of health, and therefore may be admitted in the case of a long period of immunity from a disease; but the qualifying word permanent has the distinct signification "to remain to the end." This qualification could then surely be made in any case of ablation of a malignant growth where the patient has died of some other disease two or three years thereafter; so that even the qualification permanent fails to express the intended idea. The term absolute cure is also employed to convey the notion of a cure free from limitation. But can it be truly said that malignant neoplasmata are permanently, or are absolutely, cured? The uncertainty of the time at which excised malignant neoplasmata may recur, as shown by Cases II, III, VII, VIII, IX, X, and XI, should make surgeons cautious in their prognosis.

The following case is cited to show that, even though there was no recurrence of the disease when the patient died, it could not properly be regarded as a permanent or an absolute cure:

Case XII. *Spindle-celled Sarcoma; Excision and Cauterization with the Thermo-cautery; no Recurrence in Two Years; Death from Pneumonia.*—Mr. M., sixty-two years of age, came to solicit surgical aid, saying that two years before he had noticed a small, hard, flat, circular, circumscribed, movable, and painless subcutaneous growth in the left temporo-malar region. This tumor increased in area until it attained an inch and a half in diameter at the time the patient presented himself for treatment.

Immediate excision, followed by cauterization, was advised and performed. An incision was made through the apparently healthy skin a quarter of an inch from the margin of the growth, which was carefully dissected out. The whole surface of the wound, together with an eighth of an inch of the surrounding integument, was thoroughly cauterized

with the thermo-cautery, and a layer of dry cotton applied to the cauterized region. Cicatrization was complete in three weeks, and no deformity ensued.

The microscopical examination proved the growth to be a spindle-celled sarcoma.

In two years there was no sign of recurrence of the disease. Shortly after this, the patient died of acute lobar pneumonia.

It would assuredly not be fair to assume that, had this patient lived another year, the disease would not have recurred. Even if the case had been styled a permanent cure—*i. e.*, a cure lasting to the end of the patient's life—it could not properly have been called an absolute cure, for the reason that the patient died within the period of a possible recurrence of the disease. It is, therefore, very questionable if the terms permanent cure and absolute cure should be applied in the case of malignant neoplasmata. The simple word cure, in the sense of restoration of health, seems sufficient, in view of the fact that the period of immunity from the disease after its extirpation is so uncertain.

The question, *Are malignant neoplasmata ever cured?* may then be answered (1) from a strictly scientific and (2) from a clinical point of view. In the first case, the answer will be negative, while in the second case it may be affirmative with qualifications. From a scientific point of view, it cannot be said that malignant neoplasmata are cured, since it is known that their tendency to recur is strong, and that the period of their recurrence is indefinite—if the term cure be used in the sense of restoration of health without limitation, as far as the particular disease is concerned. But if, from a clinical point of view, the term cure be used in the sense of temporary restoration of health, as far as the particular disease is concerned, it may then be said that malignant neoplasmata are practically cured, especially when the period of immunity is extended to eight, ten, fifteen, twenty, thirty, or forty years after excision. A reasonable doubt as to accuracy of diagnosis naturally arises when a neoplasma, said to be malignant, is declared cured many years after its ablation, unless its rela-

tion come from an experienced clinician and include the statement of a searching microscopical examination of the excised growth by a competent patho-histologist, or unless it be known to have recurred in after years, as in some of the cases herein reported.

The allusion to diagnosis in the preceding paragraph suggested the following note :

About thirty years ago a delicately constructed instrument, much employed by Duchenne and other Frenchmen, and also by Americans, afterward variously modified under the name of harpoon, was contrived for the exploration of deep-seated diseased tissues, and the removal from their substance of a small segment for microscopical examination. This explorer, though still much used by physicians, seems to be little employed by surgeons. It should occupy its proper place among instruments of precision for the diagnosis and prognosis of neoplasmata, and should be resorted to in most cases where there is a doubt as to the nature of growths, before deciding upon the character of the operation to be performed. But the exploration should be followed by the operation as soon as the microscopical examination can be made, within an hour if possible, in order to guard against metastasis. A case lately occurred at Bellevue hospital in which there was reason to believe that metastasis to the internal organs was the consequence of two such explorations,—the first seven, the second three, days before the operation of orchidectomy for a medullary carcinoma. The patient died in six weeks after the operation, from medullary carcinoma of the mesenteric glands, liver, pancreas, and kidneys. Before the operation, and for two weeks thereafter, he had had no symptoms of internal disease.

When the opinion of a patho-histologist is solicited in regard to the nature of an excised tumor, he should be allowed to make a gross anatomical inspection of the entire tumor, and to indicate the removal from it of such portions as he may require for microscopical examination. When only particles of a tumor are removed for diagnosis before the operation of excision, it is not to be expected that he will be able to discover the nature of the tumor from the examination of these small parts unless they be removed from the body, and not from the surface, of such tumor. It is generally very difficult to form a decided opinion as to the nature of a tumor by the study of a very small portion of the growth, for small fragments may contain nothing characteristic of a particular neoplasma; and he who makes the microscopical examination in such a case can only report that he has found nothing to indicate the exact nature of the tumor.

Before dismissing the question of cure, it was thought proper to formulate briefly certain principles and procedures that may be advantageously applied in connection with the extirpation of neoplasmata and their medicinal after-treatment.

1. A suspicious neoplasma, susceptible of excision, cannot too soon be removed. The earlier the operation, the greater the chances of prolonged immunity.

2. In the excision of malignant neoplasmata, as much of the neighboring apparently healthy tissues should be sacrificed as is compatible with sound judgment.

3. Immediately after the excision of malignant neoplasmata, careful search should be made for diseased neighboring lymphatic ganglia, all of which should be removed.

4. Excision of multiple malignant neoplasmata is contra-indicated, particularly when they invade many lymphatic ganglia, or when they are disseminated in hundreds upon the surface of the body. If, however, there be among them a very large growth, seriously interfering with a vital function, the excision of this growth is warranted on account of the temporary benefit that may thus be conferred upon the sufferer.

5. When a malignant neoplasma is in a state of ulceration, and this necrotic process and consequent putrescent discharges become a source of exhaustion to the patient, the growth, if accessible, should be forthwith removed. By this means suffering is mitigated, and the life of the patient is rendered more tolerable, and may even be prolonged many months.

6. When haemorrhage from a malignant neoplasma threatens life, the diseased mass, if within reach, should be extirpated without delay, to prevent sudden death from a great loss of blood, though the general infection be such as to give the surgeon little hope that the patient will live more than a few weeks.

7. When an ulcerated malignant neoplasma involves a large cutaneous surface, a cutting operation being contra-indicated, applications of sundry kinds, such as cataplasms, soothing

lotions, deodorisers, etc., should be made, and opiates should be administered in sufficient quantity to mitigate pain and insure sleep.

8. Whenever its locality and other circumstances are favorable, the whole wound resulting from the excision of a malignant neoplasma should be cauterized as freely as the nature of the case will permit.

Cases I, V, XII, and the following case (XIII), illustrate, among other points of interest, the extent of surface to which the cautery may be safely applied, particularly Cases V and XIII.

CASE XIII. *Cutaneous Epithelioma in the Hypogastric Region; Excision and Cauterization with the Thermo-Cautery.*—N. R., fifty years of age, was admitted to Bellevue hospital on the 6th of November, 1886, suffering from a somewhat painful ulcer in the hypogastric region, measuring two inches and a half by three inches and a half, and having the gross characters of an epithelioma, which had made its appearance five months prior to his admission to the hospital. Excision, followed by cauterization, was advised and performed on the 13th of November, 1886. The circumscribing incision was made a quarter of an inch beyond the indurated margin of the growth, which was dissected from its bed. The whole denuded surface, together with a quarter of an inch of the surrounding integument, was freely cauterized with the thermo-cautery, and a light dressing applied.

The microscopical examination of the growth was made by Dr. H. M. Biggs, whose report was confirmatory of the diagnosis of epithelioma.

On the 18th of November the dressing was removed, with a part of the slough, exposing a granulating surface of three inches and a half by five inches and a half, which, on the 10th of January, 1887, was entirely healed.

The patient was seen in May, 1888. The cicatrix was sound and firm, and there was no sign of recurrence.

For some years past the thermo-cautery has been used to a considerable extent in the surgical treatment of malignant neoplasmata, one of the ways in which it has been applied being to make, with the cautery-knife, a deep incision around the growth, which is left in its place to slough if it will. But, in accordance with the principles of sound surgery, it would seem much preferable to excise the entire growth, and imme-

diately afterward to cauterize the whole denuded surface and the edges of the wound, as described in Cases I, V, XII, and XIII, rather than to allow the diseased mass to slough out and perhaps leave behind the germ of another growth.

The anhydrous sulphate of zinc, the chloride of zinc, chromic acid, and other potential cauteries have been used with good effect immediately after the excision of malignant neoplasmata; but the actual cautery is quicker and more certain in its effect. On these accounts it is preferable to the potential cauteries.

It is not proposed to discuss the entire question of potential cauteries, but mention should be made of Maisonneuve's caustic arrows, which have been employed in some cases where ablation with the knife could not be practised; but they, as well as the other potential cauteries, have been used also in ordinary cases.

The application of any irritant, or a slight cauterization with nitrate of silver, in the case of epithelial growths that have been inactive for several years, has been known to cause their rapid extension and to lead to a fatal issue in the course of a few months, whereas a radical operation with the knife would have given a fair chance of immunity from the disease, possibly for a long period.

Charlatans, still preying upon the credulity of the people, are exploiting their "specifics" and arsenical and other pastes and plasters, which they appear to use without the least discrimination, their "cures" being effected only in the case of benign tumors, to which they almost invariably give the name of cancer. These pastes and plasters, which cause the most excruciating pain for several hours, almost always fail to remove the entire tumor in the case of true cancer. The portion thus left behind, however small it be, grows with great vigor in its newly tilled soil, for the ensuing irritation favors very active cell-proliferation; and in a few months the disease invades the surrounding tissues and lymphatics to the extent of sometimes contra-indicating excision, or has so infected the organism as soon to prove fatal.

The persistent local application of ice as a mode of treatment of some malignant neoplasmata was employed in 1848 by Bennett, in 1850 by Arnott, in 1852 by Simon, and afterward by Follin and Velpeau; but this agent was found only to retard the development of, and not to cure, these growths. Simon reports a case of breast cancer of the "size of an orange," which, he says, nearly disappeared in thirty-four days from the beginning of the application of pounded ice; but the disease soon after greatly increased, and the patient died in about eleven months.

For the eradication of malignant neoplasmata, compression, electricity in several of its different forms, ligature of the principal nutrient arteries of the growths, and many other more or less harsh methods, have been tried in vain. Early extirpation by means of the much-dreaded knife, particularly when it could be supplemented by the actual cautery, seems to have given the best results.

9. The medicinal treatment of malignant growths has been too generally discarded of late years. This treatment fell into disrepute because of the inconsiderate and extravagant claims made for many so called specifics, and because it was used as a distinct means of "cure" and not as an adjuvant of surgical treatment. Very much mischief has been the outcome of attempts made to cure malignant tumors exclusively by means of internal medication, which is so delusive as to lead both physician and patient to temporise until it is too late for operative interference. No kind of medicinal agent so administered has ever cured malignant tumors. Nothing short of their extirpation, principally with the aid of the knife, has ever been of any avail; and this mode of treatment often requires to be supplemented by the cautery, and to be employed in an early stage of the disease. Then, and only then, are the longest periods of immunity likely to follow; and only as a help to this end is constitutional treatment of any use.

In conclusion, and as a topic of general interest, a few of the medicinal substances used from time to time in the treatment of malignant tumors will be briefly noticed.

Innumerable "cancer specifics," some of them most loathsome, have been taken by the people in times long past, through ignorance and superstition. Even at present not a few persons advocate the employment of the most hurtful nostrums.

In the last century Stoerk proposed the use of hemlock in the treatment of cancer, and this therapeutic agent continued to be largely used by many physicians until very late years, and even now a few medical practicers persist in its employment.

Among the more modern remedies may be mentioned the red-clover tea and the tinctures of thuya and of hydrastis, the latter in doses of fifteen drops, repeated three times each day for several months.

Chian turpentine, so much in vogue twenty years ago in the treatment of cancer, has, in the last few years, been reintroduced into practice by Professor Clay, of Birmingham, England. He gives it in emulsion, and asserts that it is very efficient in carcinomata and epitheliomata, even when in an advanced stage.

The proposition of Auzias Turenne to syphilize patients recently operated upon for cancer should not be omitted from catalogues of curiosities of the literature of cancer therapeusis.

Those who reject medicinal after-treatment in cases of cancer ablation go to the other extreme of error. Many surgeons of large experience and excellent judgment favor a vigorous course of medicinal and hygienic treatment, and believe that iron, arsenic, and other reconstituents greatly aid in prolonging the period of immunity from malignant neoplasmata after their excision.

APPENDIX.

The following schema, from an essay on the classification of tumors now in course of preparation, is appended to illustrate the method of nomenclature and classification suggested

at the beginning of this discussion, the order epithelial neoplasmata, its genus, species, varieties, and subvarieties having been selected for the purpose.

The anatomical basis is closely adhered to in this nomenclature and classification—that is to say, all the departments of anatomy are made subservient to its purposes. Any single department would not suffice to constitute the basis, while all jointly give a stable and solid foundation. Thus, descriptive anatomy, physiology, embryology, histology, etc., and the law of Müller, the blastodermic theory, morphism, and even aetism, are all laid under contribution as occasion requires.

CLASS I. NEOPLASMATA.

ORDER I. EPITHELIAL NEOPLASMATA.

GENUS I. EPITHELIOMA.

Species 1. Polymorpho-cellular epithelioma (*cancer*).
- *Variety* 1. Polymorpho-cellular ino-epithelioma (*medullary cancer*).
- *Variety* 2. Polymorpho-cellular hyperino-epithelioma (*scirrhous cancer*).
  - *Subvariety* 1. Telangiectatic polymorpho-cellular ino-epithelioma (*fungus haematodes*).

Species 2. Cylindro-cellular epithelioma.
- *Variety* 1. Cylindro-cellular ino-epithelioma.
  - *Subvariety* 1. Papillary cylindro-cellular ino-epithelioma.
  - *Subvariety* 2. Telangiectatic cylindro-cellular ino-epithelioma.

Species 3. Squamo-cellular epithelioma (*epithelioma*).
- *Variety* 1. Myxoid squamo-cellular epithelioma.
- *Variety* 2. Keratoid squamo-cellular epithelioma.
  - *Subvariety* 1. Papillary squamo-cellular epithelioma.

Of the order epithelial neoplasmata, epithelioma is the only genus, and this genus has three species.

The names given to the order and genus indicate that they comprise all epithelial new-growths.

The name given to *Species* 1 indicates that the tumor is chiefly composed of cells of many forms, constituting one of the essential characteristics of what is commonly called cancer.

Variety 1, of *Species* 1, bears the name of the species with the affixion of ino to indicate that it contains fibrous tissue,—the fibrous tissue forming alveoli, with thin walls, in which the cells are inclosed. This is one of the essential characteristics of what is known as medullary cancer.

Variety 2, of *Species* 1, bears the name of the species, with the affixion of hyperino, to indicate that it has an excess of fibrous tissue,—the excess of fibrous tissue forming thick-walled alveoli, in which the cells are inclosed. This is the essential characteristic of what is known as scirrhous cancer.

Subvariety 1, of *Variety* 1, bears the name of the variety, with the affixion of telangiectatic to indicate that the tumor contains dilated blood-vessels. This is the main characteristic of what has been called fungus haematodes.

The polymorphism of the cells of this species of epithelioma, and the presence of fibrous tissue in its varieties, show it to be derived from the elements of the epiblast, hypoblast, and mesoblast.

Species 2 is named to indicate that the tumor is chiefly composed of cylindrical epithelial cells.

Variety 1, of *Species* 2, bears the name of the species, with the affixion of ino to indicate that it contains fibrous tissue.

Subvariety 1, of *Variety* 1, bears the name of the variety, with the affixion of papillary to indicate that its surface is covered with papillary projections.

Subvariety 2, of *Variety* 1, bears the name of the variety, with the affixion of telangiectatic to indicate that it contains dilated blood-vessels.

The form of the cells of this species of epithelioma shows that it is derived from the elements of the hypoblast.

Species 3 is named to indicate that the tumor is chiefly composed of squamous epithelial cells. This is the essential characteristic of what is commonly called epithelioma.

Variety 1, of *Species* 3, bears the name of the species, with the affixion of myxoid to indicate that its cells are like those of the mucous layer of the epidermis.

Variety 2, of *Species* 3, bears the name of the species, with

the affixion of keratoid to indicate that its cells are like those of the external layer of the epidermis, and show a tendency to horny formation.

Subvariety 1 is named to indicate the existence of papillary projections from the surface of the growth.

The form of the cells of this third species of epithelioma shows that it is derived from the elements of the epiblast.

Colloid and melanotic are not included among the subvarieties any more than other degenerations and infiltrations, on account of the fact that not only the tumors but other diseased tissues of the body are liable to colloid and fatty degeneration, and to pigmentary and calcareous infiltration.

The tumor called atrophying (shrivelling) scirrhous cancer is also excluded from this classification for the reason that the condition in question is not essential to any species, variety, or subvariety. It is simply an incidental retrograde metamorphosis, a sclerous degeneration of the fibrous tissue of a polymorpho-cellular hyperino-epithelioma.

QUESTION I.

WHAT ARE NEOPLASMATA, AND WHAT ARE THE CHARACTERS WHICH DIFFERENTIATE THEM FROM BLASTOMATA, AND THESE FROM INFLAMMATORY PROCESSES?

QUESTION II.

WHAT ARE THE ADVANTAGES OF NAMING AND ARRANGING THE NEOPLASMATA IN ACCORDANCE WITH THEIR HISTOGENESIS?

QUESTION III.

WHAT IS THE VALUE OF THE ANATOMICAL BASIS TO THE CLINICIAN WHEN THE QUESTION OF MALIGNITY ARISES?

QUESTION IV.

WHAT ARE THE OBJECTIONS TO THE GROUPING OF NEOPLASMATA IN ACCORDANCE WITH BENIGNITY AND MALIGNITY?

Discussed by HERMANN M. BIGGS, M. D., of New York County.

Question I. What are neoplasmata, and what are the characteristics which differentiate them from blastomata, and these from inflammatory processes?

Neoplasmata are more or less distinctly circumscribed masses of tissue of new formation, that tend to persist or increase in size. This tendency to persist or increase in size is independent of the condition of nutrition of the organism from which they arise. Although composed of tissues simi-

lar to those normally existing in the human body, and although they derive their origin and nutrition from these tissues, yet the neoplasmata lead a distinctly independent existence, and often grow rapidly when the organism from which they arise is rapidly emaciating. Their conditions of life are determined by the same general laws that govern nutrition, growth, and reproduction in the healthy tissues from which they arise, and they are subject to the same degenerative processes that affect other tissues. They differ from the normal tissues, in that they have no function to perform in the economy of the organism from which they arise; their growth is not determined or limited by the definite purpose which it is to subserve, as is the case with normal tissue, and the conditions of their growth and nutrition are largely independent of those obtaining in the parent organism. They show peculiar lawlessness, that gives them a distinct character and separates them widely from forms of hypertrophy and hyperplasia. In the sense of their independent existence, neoplasmata are parasitic, although they are anatomically similar to, and their cells are direct descendants from, the tissues of the organism which gives them nutrition. There is a kind of antagonism existing between them and the parent tissues which also allies them to the parasites. Within certain limitations, conditions of favorable nutrition in the parent organism are unfavorable to the new growth; and, on the other hand, abundant nutrition and rapid growth in the neoplasm are entirely at the expense of the parent organism.

We have now but to define the blastomata to differentiate them from the neoplasmata. The blastomata (infectious granulomata) are infectious inflammatory new formations, which show no tendency to persist or increase beyond a certain size. They do not usually pass beyond the stage of granulation tissue in their development, soon begin to degenerate, and when the cause which has determined their formation is destroyed, they completely degenerate and disappear, or become organised by the formation of the tissue from

which they are generated. Farther than this, their formation is a conservative process, tending to limit the extension and multiplication of the organisms that cause their growth. The process of formation of the blastomata may be characterized, I believe, as a sort of solid suppuration, their formation, like suppuration, as has been said, being conservative. The blastomata, then, differ from the neoplasmata in that their formation is determined by the action of specific forms of micro-organisms. This process of formation is conservative; they do not tend to persist and grow; they do not usually form anything higher than granulation or embryonic tissue; they disappear as soon as the cause which has determined their formation is destroyed.

The blastomata are differentiated from the inflammatory processes by their occurrence in the form of minute nodules or tumors; by the constant presence in them of specific forms of micro-organisms; by their failure to pass on to the fibroblast stage of development; by their early tendency to degeneration; by their local infectivity; and by their tendency to dissemination and reproduction in distant parts. Although these characteristics separate them considerably from the ordinary inflammatory processes, yet they are essentially inflammatory in their nature, and are in reality only infectious inflammatory new-growths.

Question II. What are the advantages of naming and arranging the neoplasmata in accordance with their histogenesis?

The only rational classification of neoplasmata is that based upon their histogenesis. Any other foundation can be only an arbitrary one, and must change with every change in our views of the nature, structure, or origin of these growths. It is impossible with an arbitrary classification to arrive at anything like uniformity in nomenclature or classification. Unless there is some common basis for classification and nomenclature, each author will use his own, and will regard and name each tumor from his own peculiar stand-

point. The only uniform basis is the anatomical one; and this not only is the simplest, but conveys with the name of the growth an intelligent conception of its composition, nature, and, indirectly, of its clinical significance, and defines pretty clearly in its name the important and essential characteristics of the tumor. It is impossible to express or appreciate, with any other classification, the delicate gradations in neoplasms in passing from those composed of embryonic tissue up to those made up of the highest types of fully developed tissue. Farther than this, as has been said, with a classification based upon histogenesis, the nature and structure of the tumor are defined; these are uniform and unchanging, and do not depend upon any peculiar views or language on the writer's part. It is also the simplest method, and is the easiest of comprehension, as it defines the tumor in accordance with the physiological type of tissue that is reproduced. "Exactness and uniformity in names and terms render much easier the acquisition of knowledge," and prevent the formation of the erroneous ideas likely to result from the use of an arbitrary, unmeaning, and inexact nomenclature. If the name exactly defines the object, a correct picture is placed before the mind whenever the name is used, and the impression soon becomes indelibly stamped upon the memory.

Question III. What is the value of the anatomical basis to the clinician when the question of malignity arises?

When the anatomical basis is used for classification, the name of the tumor, since it defines it, conveys indirectly to the mind of the clinician an approximate idea of the degree of malignity. This is true of no other classification, and is constant, there being no considerable variation with time, place, or observer.

We know that the degree of malignity of a tumor bears a constant but inverse ratio to the degree of development, as judged by the physiological type of tissue reproduced in it.

With the anatomical basis for classification and nomenclature, the name of the tumor describes the tissue composing it. With these two facts in mind, and with a moderate knowledge of the histological structure of the tissues of the body, a pretty accurate conception of the relative degree of malignity of any growth may be obtained without an intimate knowledge of the structure of neoplasmata.

This conception, moreover, cannot be obtained by any other process of classification.

When we read of organoid or cellular tumors, psammomata, and gliomata, &c., unless we know exactly what the writer defines as organoid or cellular, unless we understand his ideas, we can gain no accurate conception of the nature of the growth that he refers to. But when we speak of connective-tissue neoplasmata, we know at once the nature of the growth and its degree of malignity.

More than this: When the anatomical basis of classification is employed, the personal views of the observer do not enter into the question; the basis is constant and unchanging, and no confusion can arise as to the cause of malignity.

Question IV. What are the objections to the grouping of neoplasmata in accordance with their benignity and malignity?

The classification of neoplasmata in accordance with their benign or malignant clinical characteristics is unfortunate, for many reasons.

First. With this classification it is assumed that there is a sharp line dividing the benign from the malignant neoplasmata. This is far from being the case: on the contrary, there is a gradual ascent from the most malignant neoplasmata to those that are quite benign. For example: In the development of connective-tissue, we find that every stage is represented, from the embryonic connective-tissue reproduced in the round-celled sarcoma to fully developed fibrous connective-tissue reproduced in the hard fibroma. The tumor at the one end of the line is perhaps the most malignant of

all known neoplasmata, while the tumor at the other end is benign. Between these two there are various degrees of malignancy, which cannot be expressed in such a classification. We must arbitrarily assign to one or the other class all tumors occupying the middle line.

There is danger also of confusion in such a classification, from two sources. First. If we regard a tumor as malignant that tends to eventuate in death, this may occur because of the essential nature of the growth, or because of its situation. If a benign growth is so situated that the functions of some vital organ are compromised, death may be the necessary result although the tumor in itself has no tendency to produce a fatal termination. Again: Confusion may arise because the term malignant was formerly supposed to be synonymous with cancer. This classification came into use at that time. Then all malignant growths were cancers, and all cancers were malignant growths. Consequently any growth not a cancer must be benign. We now know that other tumors may be quite as malignant as carcinomata.

This brings out another objection. In such a classification we group together neoplasmata essentially different in origin, structure, and in their clinical significance, and having as their only characteristic in common a tendency to a fatal termination.

The personal factor of the observer also comes largely into play. Certain growths may be regarded as malignant by one observer and as non-malignant by another, so that there is a constantly varying standard, and the dividing line between the two classes is ever changing.

Such a classification, then, is wholly arbitrary and unscientific, having for its only foundation a varying and often uncertain characteristic—the degree of malignity. Surely, no farther arguments are necessary to wholly condemn it, excepting as the terms benign and malignant may be used in a general way loosely to describe the prominent characteristics of a growth, exact knowledge of which it has not yet been possible to determine.

QUESTION V.

WHAT CONSTITUTES MALIGNITY, HISTOLOGICALLY AND CLINICALLY?

QUESTION VI.

WHAT IS THE MECHANISM OF THE NECROTIC PROCESS WHICH SO OFTEN OCCURS IN CERTAIN NEOPLASMATA?

Discussed by

CHARLES B. NANCREDE, M. D., of Pennsylvania
[who also considers Questions 4 and 13].

NATHAN JACOBSON, M. D., of Onondaga County
[who also considers Question 13].

DR. CHARLES B. NANCREDE.

Question IV. What are the objections to the grouping of neoplasmata in accordance with benignity and malignity?

The only valid objection which can be urged against this classification is the well known fact that new-growths which neither locally infect,—*i. e.*, infiltrate, disseminate, recur locally,—nor present heterologous types of issue, may, from fortuitous surroundings, or complications, assume what I would term clinical malignity.

Thus, I have known an enormous fatty tumor of the thigh, by ulceration, haemorrhage, etc., prove clinically malignant. Again: Fibrous polypi of the naso-pharynx, by haemorrhage or pressure on important parts, prove fatal, while, *per se*, both these growths are benign, and are composed of a stable tissue whose type may be found almost anywhere in the body.

Numerous other instances of this clinical malignity will

doubtless occur to all present. Moreover, this classification involves the grouping together of different types of neoplasmata, such as the epithelial and connective-tissue, while in addition the question of prognosis is involved.

Question V. What constitutes malignity, histologically and clinically?

Malignity, briefly expressed, is the invasion of one form of histological elements by histological elements of a different type, the invading elements being incapable of developing into a stable tissue. Thus, in epithelioma of the lip, we find the connective-tissue of the derma, nay, more, the whole connective- and muscular-tissue of the affected part—all connective-tissue derivatives—invaded by epithelial cells. Again: In true glandular carcinoma of the breast, for instance, the connective-tissue barrier is no longer respected; but epithelial, or at least epithelioid, cells are found infiltrating the connective-tissue, fasciae, and neighboring muscles.

Since the acini of all glands, especially those of the mamma, are in direct continuity with the lymph-system, a secondary involvement of the lymphatic glands, and, later, infiltration of the afferent lymphatic vessel-walls with similar alien epithelial elements, occur. These heterologous cells, strained out of the lymph-current, at once multiply in the lymph channels, forming epithelial-celled tumors. Would this be so if connective-tissue, *i. e.*, homologous cells, were arrested here? I think not. The same process occurs when the connective-tissue limit of each gland acinus is broken through, and the surrounding tissues become infiltrated, since all are well aware that the inter-spaces left between the bundles forming all connective- and areolar-tissues are in reality the radicles of the lymph system. Moreover, the infiltrated cells, here as elsewhere, fail to develop into stable tissue, but, conversely, are doomed to histological decay.

These histological sequences are in marked contradistinction to those which are observed in the evolution of the be-

nign epithelial neoplasms. Thus, a papilloma is, equally with an epithelioma, an epithelial new-growth; but mark the essential difference: In the papilloma, *the various histological elements maintain their due relations to one another;* the epithelial cells proliferate, but they only mingle with their homologous cells; the connective-tissue forming the basis of each papilla, grows luxuriantly; but it does not mingle with the epithelial cells, nor do these elements invade it.

In like manner, contrast the life-history of an adenoma with that of a carcinoma of the breast. Here, as in carcinoma, the acini become choked with epithelial elements. Retention-cysts, etc., may be formed; nay, more, ulceration from pressure on the minute vessels, or from outripping of their blood-supply by the cells, may result;—but to revert to our definition: One form of histological elements does not invade histological elements of a different type. Indeed, in the case of adenoma, the cell-collections remain surrounded with the original basement membrane of the acinus.

Will my definition hold good for the other great class of malignant growths, the connective-tissue type,—the sarcomata?

A minute's reflection will demonstrate the following statements to be facts:

An examination of a sarcomatous breast will reveal that where formerly there existed the orderly arrangement of acini, lined with epithelial cells resting upon their basement membrane, each acinus communicating with the lymph system and surrounded by fully developed connective-tissue supplied by blood-vessels possessing adventitia, media, and intima, now only a mass of cells can be detected, of a connective-tissue type, but incapable of farther histological development, without lymphatics, and whose blood-vessels are little more than mere channels through the cell-mass, without the most distant approach to the three normal vascular coats.

From this absence of the normal coats, cell-masses readily protrude into the vascular lumina, are broken off and swept away by the blood-current, to lodge in distant capillaries,

thus generalising the disease; but either from the total or relative absence of lymphatics, the glands are but rarely involved. May I not suggest that the sarcomatous cells probably often *do* reach the lymphatic glands; but being *comparatively homologous*, either degenerate or become converted into lymphoid-tissue, or cells, by cell- or lymph-tissue infection, if I may coin a term?

Clinically, malignity is constituted by rapidity in growth; infiltration of surrounding tissues, *i. e.*, local infection; in epithelial growths, involvement of the next series of lymph-glands, *i. e.*, intermediate infection; generalisation, *i. e.*, systemic infection; inevitable degeneration, breaking down, and destruction both of primary and secondary growths, if life be sufficiently prolonged; and, finally, local recurrence.

Question VI. What is the mechanism of the necrotic process which so often occurs in certain neoplasmata?

Necrotic processes, except one mechanical cause presently to be mentioned, all result from an insufficient blood-supply to the histological elements. Thus, to revert to one of my previous illustrations, the squamous epithelioma, the pegs of cells invade and infiltrate the corium and subcutaneous tissues, until the more superficial cells and also those at the centre of the neoplasm have become removed, as compared with those of a normal epithelial tissue or even a papilloma, an enormous distance from their vascular supply. Solely in consequence of this, or from thrombosis of vessels from cell-pressure, or from infarcts, fatty degeneration and partial liquefaction ensue.

Should this process occur upon a free surface, infection from without superadds true inflammation, which, by its exudates, still farther strangulates the blood-supply of the new-growth, suppuration and true gangrenous processes result, with partial, molecular death; *i. e.*, ulceration or more massive sloughing occurs.

There is hardly room for doubt that traumatisms may, as

in healthy tissues, set up true inflammation in the depths of neoplasmata whose coverings are intact, and may thus produce some of the retrogressive changes.

In certain sarcomata, the exceptional mechanical cause above referred to cannot be ignored.

In the softer varieties, the fragile-walled vessels often give way, producing *mechanical destruction* of the morbid tissues, beside cutting off the vascular supply to more distant parts by pressure of the effused blood or destruction of the supplying vessels.

Similar explanations will account for the necrotic processes occurring in other forms of new-growths, with the superaddition in some of the effects of the contraction of newly formed tissues interfering with due blood-supply, and producing retention-cysts, etc., which, by their pressure, cause secondary histological anaemia.

Question XIII. Are malignant neoplasmata ever cured?

In the study of this question we should, I think, examine what *a priori* probability of a favorable answer analogy and deductions therefrom afford, and then endeavor to ascertain whether clinical facts bear out our conclusions.

First, examine with me squamous epithelioma of the lip, and determine why this growth rarely, if ever, destroys life by generalisation, but merely by ulceration and consequent pain, haemorrhage, and sepsis.

At once the large size of the component cells, their comparatively absolute immobility, from the lack of fluids and uninterrupted blood-supply, will explain on purely mechanical grounds the facts that glandular growths appear very late, and that the cancer-cells almost never escape straining out, as it were, by the lymph-glands, in consequence never reaching the blood-current.

Few, I suppose, will deny that early and *adequate* removal of the primary growth when no gland involvement exists, will, in this form of carcinoma, usually result in permanent

cure. Why is this? Simply because the disease, while undoubtedly malignant, is *primarily a local one*, and from the mechanical causes just explained late involvement of the glands occurs, and when this has taken place generalisation rarely results, so that granted a really complete removal of the local and secondary depots, the disease does not recur, *i. e.*, is cured.

Again: I challenge the production of any unimpeachable post-mortem record of a case of generalisation of other forms of carcinoma, whose greater cell-mobility and the form of whose histological elements favor dissemination, where the following facts cannot be read by any one with only a moderate anatomical and pathological knowledge,—viz., that the disease started at one point; that the first lymph-glands intervening between the venous system became then affected; that if a secondary or tertiary group existed, they had been *in order* attacked; and that then, and then only, the blood current having been reached, certain organs became the sites of metastatic growths, their points of lodgment being explained by the calibre of the capillaries, the possession of a double capillary system, as in the kidney and liver (practically), or some other local peculiarity of the vascular apparatus, as in the spleen or in the terminal character of the cerebral vessels; that if farther dissemination had occurred, these primary visceral metastatic growths were the sources of the secondary, and they, in turn, of the tertiary, visceral deposits.

If my facts be facts, what conclusion am I not only warranted in drawing, but actually driven to make? Surely, that at some period the disease was an absolutely local one, and if local, then certainly curable, if capable of complete removal.

Theoretical objections, and those deriving apparent support from improperly conducted autopsies or inadequate operations, are sufficiently answered by the just detailed facts for any one who will "read between the lines," and cannot be met by generalisations, but each case must be

studied and explained by itself, which task I leave for others.

Finally, what does clinical observation teach? That working upon the lines of argument above laid down, surgeons *have* cured undoubted cases of carcinoma of the mamma. My own experience, as both a pathologist and clinician, leads me to believe that growths *recurring*, as it is said, after three or more years, should be considered not as recurrences, but as new manifestations of the peculiar irritation productive of malignant growths, acting upon anatomically predisposed tissues, precisely as I consider a second or third attack of scarlatina as a new disease, not as a recurrence of the original attack.

Thus in my own practice I can report at least one patient whose breast and the secondarily involved contents of whose axilla I removed over eight years ago, with immunity from return. This was an exceptionally early operation—within two months of the inception of the disease. If, as experience has shown, the recurrence of carcinoma mammae after three years is almost never observed, my case can be fairly claimed as a cure.

Allow me to present, by his kind permission, the latest results of Prof. S. W. Gross's operations for mammary carcinoma: 4.44 per cent. died from operation; 28.95 per cent. show local recurrence; including the deaths, 22.5 per cent. recovered. Of these, one died of an intercurrent disease in 7 years and 10 mos., while the remainder are doing well; one for 9 years and 10 mos.; one for 9 years and 1 mo.; one for 6 years and 9 mos.; one for 4 years and 3 mos.; one for 3 years and 11 mos.; two for 3 years and 6 mos.; one for 3 years and 5 days.

Of 328 cases reported by Banks, Kuester, and von Bergmann, 10.67 per cent. died; local recurrence took place in 54.92 per cent.; and 15.15 per cent. were cured.

Dr. W. Jos. Hearn, one of my surgical colleagues in the Jefferson Medical College Hospital, informs me that he has recently lost from another disease a patient who had remained free from any evidences of carcinoma for between

four and five years, and has another patient now living and free from any recidives, operated on about four years since.

I submit, then, for your acceptance, the proposition that malignant growths are curable, and ask you whether a candid consideration of the facts I have presented does not warrant the decision on your part that I have proved, both by analogy and clinical facts, the thesis I have been defending.

As Dr. Gouley has introduced the question of the method of operating in the body of his paper, permit me to mention that in mammary carcinoma, for instance, I remove the disease in the freest possible manner, clearing out the axillary fat and lymphatics, as well as the glands themselves, going under and above the clavicle when necessary. I do more, for when I am not reasonably sure before operation that I can thoroughly clear out the axillary contents, my first incision is made into the axilla, when, if I find that I cannot with thoroughness and safety clear it, I do not attempt the removal of the primary growth, but abandon the operation.

DR. NATHAN JACOBSON.

Question V. What constitutes malignity, histologically and clinically?

From earliest times tumors were grouped in two classes, the benign and malignant. Long before exact methods of observation permitted closer discrimination, the physician recognised these two groups. From the patient's stand-point the most important question is, whether the tumor is, or is not, innocent in character. To the surgeon, too, this division of neoplasmata, based as it were upon prognostic considerations, is all important. It establishes the time for, and the character of, any operative interference. It continues the patient under observation for a period of years, or leads to his dismissal after operation. And therefore it is proper, though perhaps very unscientific, to view tumors in this light.

What is understood by the malignity of a neoplasm? If we are to consider it synonymous with danger to life, tumors in themselves innocent would by location become malignant. This is obviously not what is meant. It refers to a growth which invades, not merely displaces, tissues in its immediate neighborhood, which excites in them such radical changes that their former identity is lost—a growth of infectious character, which disseminates its infection through vascular and lymphatic channels, heaping up its infectious elements in the glands and organs of the body. The malignity of a tumor excludes its being serious simply because of its local disturbances, but ranks it as one capable not only of producing local destruction of tissue, but of extending its destructive tendencies to various organs, and thus imperilling life. Not all malignant tumors possess this power to an equal extent, nor do all tumors, histologically identical, exhibit the same degree of malignity. Moreover, in others the border line between benignity and malignity cannot be well drawn. The manner of growth of malignant neoplasmata is extremely suggestive of their germ-origin. In these days of bacteriological investigation, it is not remarkable that much attention has been devoted to the search for some microbe, the presence of which might definitely establish the malignant character of a tumor.

In November of last year, at a special meeting of the Society for Internal Medicine of Berlin, Dr. Scheuerlen, clinical assistant of Prof. Leyden, presented a paper upon the "Aetiology of Cancer." It was based upon a study of ten cases of carcinoma of the mamma, five of the uterus, five of the cervix, three cases of metastic cancer of the liver, and one of the stomach. He asserted that cultures made from spores found in each of these tumors led to the development, each time, of the same bacillus.

Franke reports, in the Muenchener Medizinische Wochenschrift, No. 4 of the current year, that he has discovered, in sarcoma, bacilli and spores which are constant. The bacilli are thinner and longer, the spores somewhat thicker and

larger, than those of the carcinoma. Schill, of Dresden, who since 1882 has searched for a micro-organism to which he could attribute the origin of cancer, claims that he constantly found in cancer-juice and sections of carcinomatous tissue rod formations, but never really bacilli. Petit (L'Union Medicale, No. 152 of last year) claims for Rappin the glory of having been the first to discover the Scheuerlen bacillus, with which he has awakened, by inoculation, a cancerous disease in a rabbit, finding here again the same microbe.

And yet good observers, who have studied the validity of these claims—among them Senger, in particular—insist that Scheuerlen has mistaken for the spore of cancer what is nothing more than that of a potato bacillus. Senger maintains that if it is really the bacillus of cancer, it ought to be evident in cancerous tissues as a bacillus. But here only spores have been found, while the bacillary growth is most luxuriant where the potato is used as soil. Moreover, in upward of three hundred and fifty inoculations the results have been negative. So, while the theory of infection through the agency of a microbe might very beautifully explain the progress of malignant tumors, we can merely say that we have reached a new stage in this study, but are not as yet able to demonstrate microscopically any pathognomonic germ; and yet the microscope has been the means of unfolding to us an explanation of these malignant attributes. In most instances it is possible to determine histologically the character of a tumor. Luecke, excluding cysts, recognises in solid tumors the only real neoplasmata. For the present discussion, this broad division will answer our purposes; but it must not be forgotten that many apparently innocent blood-cysts are really haemorrhagic sarcomata, their walls presenting the characteristic microscopic appearances.

Speaking generally, it may be said that those solid tumors which exhibit, microscopically, maturely organised tissue formations, are innocent, while those whose counterpart cannot be found in the mature body, but which present a rich, though immature, cell-structure, are malignant. This brings us to

another question—the histogenesis of tumors. The two forms of malignant growths—the sarcoma and carcinoma—exhibit no typical matured tissue in their construction. Sarcoma is a connective tissue tumor, with its component cells in their embryonic state. For many years one form of cancer bore the name of epithelioma, as it was apparently of epithelial lineage. In 1871, Waldeyer, in an able resumé of his own as well as of the labors of other German co-workers, published in Volkmann's Sammlung an address which took the advanced stand that all forms of cancerous disease were of epithelial origin. In studying the development of these two forms of malignant disease, it becomes apparent that they do not imitate in their growth the typical connective and epithelial tissues, but that sarcoma becomes the atypical, unrestricted, connective-tissue tumor, and carcinoma the atypical, unrestricted, epithelial tumor. More than this, the kind of epithelium present at the site from which the tumor grows indicates the kind of carcinoma we are to encounter. Squamous, spheroidal, and cylindrical epithelia develop in turn not only primary carcinomata of their distinctive types, but maintain their individuality even in secondary formations. The same independence for round and spindle cells is claimed by Ackerman in his very learned discourse upon the histogenesis of sarcoma. These two kinds of malignant tumors maintain their respective types throughout the whole life-period of their growth. There is no conversion of cells of one tissue to those of another, no growth of primary cancer from connective-tissue. This statement is not to be understood as opposing, but rather as explaining, the conversion of mature epithelial or connective-tissue tumors into the malignant ones of their kind.

The blood-vessels form the centre of growth of the sarcoma. About them the spindle cells are seen to form, and, indeed, are seen to grow out of their adventitia. The blood-vessels increase in number and size, and soon countless nucleated spindle cells, sometimes large and again small, are seen isolated or gathered into bundles. If the formation has been rapid,

no time for fibrillation occurs, and we have a tumor which may attain great size, rich in vessels and of soft consistence. Here the vessels may seem converted into, or built up of, spindle-shaped sarcoma cells, and the blood current may course through a series of sarcomatous canals. With slower growth we recognise microscopically a distinct fibrillar arrangement, and the tumor macroscopically is seen to possess a firmer structure. The particular arrangement of this new connective-tissue will vary with the location of the growth, not only because of the peculiarities imparted to it by location, but also because of the rapidity of growth which its situation may excite. As the tumor grows by addition to its surface, the part nearest its circumference presents the most recent tissue formations.

We have another variety of connective-tissue tumor, the very counterpart of new granulation tissue—the round-celled sarcoma. Here we find, in addition to the connective-tissue stroma just mentioned, a large number of round cells, some corresponding to leucocytes in appearance and action, others like mucous corpuscles or certain glandular cells. They are densely crowded between the meshes of the stroma. We encounter round cells of varying size, called small and large, and which Ackermann, because of their capability of taking on different stains, believes to be different kinds of connective-tissue cells.

The stroma of sarcoma may assume most atypical and polymorphous shapes. It may not only be spindle-shaped and fibrillar, but may be stellate, pyramidal, and extremely irregular, or may at times resemble strongly the spacing met in carcinoma, when it is termed alveolar sarcoma. It is thought by Ziegler that the conversion of a network of vessels into sarcomatous tissue leads to this alveolar formation. Scattered among the spindle and polymorphous stroma, we sometimes find large multinuclear cells, known as giant cells. They are particularly encountered, like their counterpart in the embryo, in bony structures.

Embryonic connective-tissue is rich in mucin. This is par-

ticularly true of that which is ultimately to be converted into adipose tissue. We find the counterpart of this formation in the tumor called myxoma. Its usual seat is, as we should anticipate, in the parts where fat abounds normally. The close resemblance to, and frequent association of this tumor with, the sarcoma render it not altogether improbable that with time they may be grouped together. Stellate and fusiform cells are found, as in sarcoma; and the difference between the two tumors is rather more chemical and physiological than histological.

It is not my intention to enter into a consideration of all the various forms of sarcoma due to location. They possess no important peculiarities save those imparted them because of their origin from specific matured connective-tissues. Mention, however, should be made of the pigmented variety, known as melano-sarcoma, with whose very malignant tendencies we are all acquainted. In its cells as well as in its intercellular substance we find abnormally developed the normal pigment of the part. It is the cell element of the growth which indicates the character of the sarcoma; and it may be said that sarcoma asserts its greatest malignity when its cells approach most nearly the type of the youngest embryological connective-tissue. And so the small, round-celled sarcoma is most greatly dreaded; next, those spindle-celled forms, where there is no marked fibrillation; while those which approach the higher and more organised types of tissue exhibit less malignant tendencies. This disposition to attain, in certain parts of a tumor, the type of mature connective-tissues, is frequently manifested by its organisation into bone, cartilage, and so on.

For this reason, it is essential that all parts of a tumor, and especially its youngest parts, be subjected to histological study in determining its malignancy. The outlines of some sarcomata can be well drawn. It is particularly the small, spindle-celled variety which appears to the naked eye to be encapsuled. Guided only by the macroscopic appearances, the surgeon would be apt, because of this thorough definition, to pronounce the growth innocent in character; but the

microscope shows that the cells utterly disregard such lines of limitation, and reach well into the surrounding structures.

Quite as certainly as sarcoma is the embryonic connective-tissue tumor, is carcinoma of epithelial origin. The time has come when we can regard cancer as being of local origin. Primary cancers occur only where, in the mature body, some form of epithelium exists.

To appreciate the character of a cancerous tumor is to study the manner of its growth. When epithelial cells multiply upon the surface of a given part, and become organised into tumor formation, the growth remains innocent in character. The moment these epithelial cells begin to invade the underlying tissues, malignancy has begun. Pursuing their course with a microscope, they are seen to enter the connective-tissue, travelling along any microscopic channel, lymph canal, or blood-vessel, and soon collect at various points in little groups called cancer bodies, building for themselves nests in the connective-tissues, termed alveoli. Virchow considered this alveolar arrangement of the connective-tissue as the essential histological characteristic of cancer, and presumed that cancer bodies, which filled the alveoli, were the outgrowth of connective-tissue cells. His view had been generally accepted until Thiersch, Waldeyer, Luecke, and others proved that they were but a result of epithelial cell invasion. Chains of epithelial cells can in some specimens be seen tunnelling through connective-tissue, and effecting in it decidedly radical changes. The entrance of epithelial cells into connective-tissue territory awakens the infiltration of this tissue with numerous round cells, resembling leucocytes in appearance. These young connective-tissue cells also decidedly impress the infiltrated tissue, and lead to farther structural changes. The relation of vessels and cells to each other is not so intimate as that seen in the sarcoma, for here they do not run between the cells, but in the alveolar structure. Epithelia are of low vital power. In normal tissues they receive their nutrition not by direct vascular supply, but by absorption; so here, in epithelial tumors, we find them thriv-

ing in the same way, and, like low forms of animal life, multiplying most rapidly.

The cells partake of the character of the epithelium of the affected part. Where the tumor is of glandular origin, as in the breast, they are spheroidal; where normally pavement epithelium is found, as upon the skin and most mucous membranes, they are of the squamous variety; and where we would be apt to encounter columnar epithelium, they are cylindrical. They resemble the various forms of epithelium in shape and nucleation; they multiply in the same manner, but in their distribution and arrangement they disregard all laws of normal growth, and go as they please. This atypical arrangement is an essential feature of malignity. The cells are absolutely unrestricted in their movements, and infiltrate all kinds of tissue. The more numerous the cells, the less abundant the connective-tissue, the more malignant the growth.

The character of the stroma depends upon the tissue invaded. As it is present in large or small amounts, the tumor is hard or soft. The alveoli do not always appear as separate cavities, but in the best specimens Waldeyer compares them to the openings in and channels through a sponge; and as by compression the sponge can be freed of water, so also can the alveoli be emptied. The cells may be so numerous as to render the existence of alveoli not apparent; but the characteristic epithelial cell is never absent.

In considering tumors only from the stand-point of malignancy, the resemblance of sarcoma and carcinoma may not be a matter of moment; nevertheless, it will be in place to say that, while in every form of cancer we have connective-tissue invasion and change, it is only the alveolar forms which particularly resemble each other. In carcinoma, however, the cancer cells and the alveoli are distinctly separate; in the sarcoma we see nests of cells sending out branches communicating with each other and with the alveolar walls, demonstrating by this connection their homogenesis.

Contrasted with benign tumors, like adenoma, fibroma,

myoma, and other forms of organised cell growth, we recognise as the characteristic histological evidence of malignity the presence in great abundance of immature cellular elements arranged in most atypical forms. Whether a microbe, yet undiscovered, awakens, through chemical or other agencies, this cell activity and disarranges the equilibrium of normal tissue growth, is still unknown.

In the clinical study of a tumor, we are concerned, first, with its history. Sarcoma, occurring when connective-tissue growth is most active, is recognised as the malignant tumor of childhood and early life. When the vitality of connective-tissue is reduced, the resistance to the invasion of epithelial tumors is lessened. For this reason carcinomata are encountered later in life.

Growing from fixed tissues, each form of primary malignant disease is found in certain structures, and even in definite locations. Primary malignant disease of bone is sure to be sarcomatous; carcinoma of bone results either from direct invasion from diseased epithelial structures or from secondary infection. Therefore, should we find no external evidence of invasion, the search for a more remote source of infection must be continued. We encounter malignant tumors at points where two kinds of epithelia meet, at constricted parts of canals, and in places particularly prone to irritation. All of these facts correspond with the theory of development made evident by histological study. Everything speaks for the local origin of malignant tumors. Were they of constitutional origin, we should expect them to crop out simultaneously from different parts of the body. On the contrary, tumors which are primarily multiple are innocent.

Heredity is no longer to be considered an important factor. Congenital tumors are not malignant. Sebaceous cysts and nasal polypi follow up certain families more frequently than does cancer. Osteomata, appearing in various members of one family, are more sure to be located alike than are malignant tumors.

Among the earliest local manifestations of a malignant

neoplasm are those due to the infection of the surrounding parts. The resulting infiltration is characterized by an agglutination of the tissues: the mucous surfaces, for example, cannot be freely moved upon the sub-mucous tissues. There occur fixation of the growth and restricted mobility of it. A malignant tumor of the breast, because of the penetrating infiltration, becomes adherent to the underlying muscular structures. It is the relation the tumor bears to its surrounding tissues which particularly exhibits its malignancy, clinically. The innocent tumor simply occupies a place in the tissues: it may, as the result of an inflammatory process, become somewhat adherent to the parts around it; it may by pressure produce atrophy of the muscles or absorption of bone. It acts only as a foreign body, and possesses no power of infiltrating the tissues in the midst of which it is placed.

Malignancy is farther evident in the infection of neighboring lymphatic glands. While this tendency is largely possessed by the carcinomata, it is also manifested by some sarcomata. In a case reported last year by Fischer of malignant sarcoma of the penis (Zeitschrift für Chirurgie, page 313), the inguinal glands on each side were converted into sarcomatous tissue. With sarcoma of the testes, frequently pelvic lymphatic glands show sarcomatous degeneration. Whether sarcoma cells, because of their size and shape, manage to pass through the lymphatics unarrested, or whether the lymphatics are not always invaded by the sarcoma cells, is yet a mooted question. But as in its origin sarcoma is so closely related to the vascular system, its dissemination is, as we would naturally expect, through the blood current, and with it we have earlier than in carcinoma the indications of more remote infection. Yet it is not always that only neighboring glands are involved. Virchow was the first to tell us that with gastric cancer the lymphatic glands above the left clavicle were frequently affected, and Belin has shown that every form of visceral cancer can exhibit glandular disease at some remote point.

In both sarcoma and carcinoma we have, sooner or later,

organic infection, the result of the deposition of malignant emboli, carried through the blood current. These find their way to lungs, liver, bone, and other parts, and thus we have aroused a series of secondary malignant growths, whose presence we establish clinically.

In form, malignant tumors present nothing characteristic. They adapt themselves to the shape of the affected part, sarcoma seeming often to be only a hypertrophy. Ordinarily they exhibit a broad infiltrated base, yet pedunculated growths may be sarcomatous in character. The vessels of sarcoma occasionally dilate to such an extent that the tumor appears like an innocent cavernous growth. One of this kind I removed three years ago from a lady's arm. Histological examination showed it to be a melanotic sarcoma. It has as yet not recurred. With carcinoma we frequently find upon the surface isolated nodules early adhering to the skin; they break down, and the ulcer resulting is surrounded with discolored infiltrated tissues.

In the examination of malignant tumors, Luecke calls attention to the fact that not all transparent tumors contain fluid. Sarcomata and myxomata are often quite diaphanous. This property is shared by some lipomata and lymphomata.

To the touch malignant tumors exhibit a varying consistence: some are extremely soft, others very firm. Many primary carcinomata exhibit an elastic hardness, while the soft sarcomata, myxomata, and softened carcinomata present elastic softness. This elasticity is often mistaken for fluctuation. The exploring needle or hypodermic syringe soon clears up the deception.

Pulsation is apparent sometimes in sarcomata of bone, or even of soft tissues. As the latter are built up largely of a sponge-like structure, and can be greatly reduced in size by compression, the pulsations may strongly suggest aneurysm. But their location, origin, and growth will usually render a diagnosis easy. When bone is the seat of a pulsating tumor, it may be considered malignant, as the medullary canal cannot well be the site of a spontaneous aneurysm.

Sarcomatous disease of long bones may so undermine their stability as to render them very fragile before tumor formation has sufficiently developed to attract the attention of the patient. In December of last year a young woman was brought to St. Joseph's hospital in Syracuse. During the preceding August she fell out of a hammock, and in the following September, while walking, she made a slight misstep, and sustained a simple fracture of the femur. At the time of accident no existing disease of the femur was suspected. Union did not take place; the rapidly increasing swelling of the thigh was supposed to be inflammatory, and was treated by fomentations. Upon her admission to the hospital the diagnosis of sarcoma was made. The disease made rapid progress; the tumor extended to the body; secondary growths occurred in the lungs and upon the skin, and in March she finally succumbed, after a most painful illness.

Another feature of malignant tumors is their recurrence after operation. In itself this is not indicative of malignity, for incompletely removed fatty and fibrous tumors will also recur. And yet the recurrence of sarcoma in the stump after amputation, the recurrence of carcinoma in the cicatrix or neighboring lymphatic glands, are, to say the least, very suggestive. The period of time elapsing after removal indicates whether the recurrence is due to the continuous growth of unremoved portions, or whether we are really dealing with a new tumor; while the parts affected by the new-growth establish whether or not there was coexisting disease of glands or internal organs.

Tumors, innocent in character and springing from specific tissues, may be converted into malignant growths of their type. Thus the papilloma may become the squamous-celled carcinoma.

During the past year the whole civilised world, and especially the medical profession, were exercised over the malignant laryngeal disease of the late German emperor. Stoerk published in the "Wiener Medizinische Wochenschrift," December 3, 1887, a most interesting paper bearing

upon the diagnosis of papilloma and carcinoma of the larynx. As it nicely illustrates some of the distinguishing features of malignant tumors, I will ask you to bear with me while I present the results of his study.

In the larynx, every affection of the epithelial surface, active or sluggish, leads to excessive epithelial growth, but none to such an extent as the papilloma. Aside from slight disturbances of phonation and laryngeal irritation, patients endure these papillary growths for an unlimited period without much inconvenience. A great quantity of catarrhal discharge is excited, and the tumor is maintained in a succulent condition. Isolated papillomata may slough and be cast off; others undergo retrogressive changes. While innocent in character, they are freely movable, produce no interference with the action of the laryngeal muscles, and maintain a pale yellowish-white color. The moment the discharge lessens and the papilloma ceases to be succulent, the floor upon which it rests changes; single masses become conglomerate, nodules appear upon the surface, the tumor is less movable, it becomes of firmer consistence, and takes on a darker hue. This dark discoloration is a positive indication of its change in character. Ultimately the tumor is found to be immovable, as though it were riveted to the substratum. With the cessation of epithelial growth upward it attains greater breadth at its base. The epithelial cells are found to have penetrated connective-tissue and muscular fibres, and the very walls of the blood-vessels are crowded with epithelial cells. This general infiltration produces great interference with the laryngeal functions. Cellular infiltration progresses, new nodules appear, and the carcinoma spreads. Disseminated papillomata exhibit least the tendency to carcinomatous conversion.

The microscopic examination of papillary masses, coughed up or removed, will not reveal the true character of the growth, for it is the examination of the base which is all-important. Endolaryngeal operations, performed for this or other purposes, have often rendered these growths unsuitable

for extirpation. The mildest operative procedures often awaken cell activity, and confer upon quiescent growths most malignant attributes. Painful deglutition, disturbed phonation, respiratory distress, take the place of a mild train of symptoms. The loss of muscular integrity, the resulting laryngeal immobility, are pathognomonic of the conversion of innocent into malignant tissue. For these reasons Stoerk believes that the diagnosis must be made with the laryngoscope, and that here, at least, clinical appearances are more to be depended upon than histological investigation.

Question 6. *What is the mechanism of the necrotic process which so often occurs in certain neoplasmata?*

Innocent tumors are not prone to necrotic changes except as a result of interference with their nutrition, or as over action in them develops inflammatory disturbance. By pressure they may occasion death in the surrounding tissues, or, as a result of their excessive growth, overlying tissues may become too tense and give way.

In malignant tumors, the outcome of a typical cell growth, there may occur cell metamorphoses and death. These tumors may additionally be subjected to accidents and diseases. Haemorrhage into a sarcoma may be so extreme as to completely alter its character. Moreover, inflammation may arise and result in structural death.

It is in the carcinomata particularly that we encounter the necrotic processes. As epithelial tumors depend upon the vessels of the connective-tissue for their nutrition, the relation of epithelial formation to the underlying structures is of vital importance. When, as a result of epithelial disturbance, the underlying connective-tissue becomes densely packed with small granulation cells, thickening and development of the epithelial body are prevented, and, cut off from its nutrient subsoil, cancerous ulceration occurs, which we call rodent ulcer.

When superficial structures become infiltrated with car-

cinomatous cells, and by tunnelling through and into them the nutrition of the part ultimately becomes affected, necrosis occurs. The resulting ulcer is not merely the result of tension and pressure, but actual cell-infiltration, and its edges bear unmistakable evidence of it. The ulcer and tumor are so intimately associated that the former simply fades into the the latter. In the same way, epithelial cell-invasion of the deeper parts cuts them off from their vascular supply. Central softening and degeneration result. The destructive process, extending to the surface, leads to the formation of crater-shaped pockets.

In the extension of carcinoma from skin to mucous membrane, the disease does not spread continuously, but the epithelial invasion reaches from the depth up toward the mucous surface and chokes the normal tissues into ulceration.

The protoplasm of the epithelial cells may undergo change. Fatty degeneration and caseation occur, particularly in the spheroidal, sometimes also in the squamous, celled carcinomata. This fatty metamorphosis may continue to such an extent as to fill some of the alveoli in carcinomatous breasts with a butyrine substance. Small losses of tissue thus result. The connective-tissue cells also undergo similar degeneration. Extensive suppuration and sloughing may follow, and in this way, too, deep pockets and great loss of tissue are occasioned.

A form of degeneration, once supposed to be a variety of carcinomatous growth, and not decay, is colloid degeneration. It is seen particularly in the carcinomata arising from columnar epithelium in the intestinal tract and the cervix uteri. Other varieties occasionally exhibit it. Its character varies with the parts involved. Unquestionably, however, it is the result of alteration in the protoplasm of the cancer cells.

Closely allied to this is the mucoid degeneration of the connective-tissue cells. We have present in all connective-tissues, as Kuehne showed, a certain amount of mucin. It is the muciparous serum which separates the sarcomatous

connective-tissue cells from each other. We encounter mucous transformation in sarcoma of the breast, testes, and other parts. It leads to necrotic changes and cyst formation in some cases.

Inflammation, rarely terminating in suppuration, occurs in sarcoma. It may lead to cell-activity, and an abscess may be suspected. But skin infiltration gives way to skin destruction, and a fungous mass appears. Butlin reports a case where a sarcoma in this way sloughed out of a boy's thigh.

In the stroma of old cancers, especially of the breast, a form of metamorphosis occurs by which the growth is said to wither. The process is rather one of organisation, a real fibrillation of the connective-tissue. By means of this cicatricial contraction the growth is greatly reduced in size.

It is evident that as cell-activity manifests itself in the growth of malignant tumors, so we see cell life intimately associated with their decay and death.

Question 13. *Are malignant neoplasmata ever cured?*

If, in referring to malignant growths, we speak of effecting a cure, and mean thereby the internal administration of medicines which will aid a given part to resist the farther invasion of the disease and to cast off the existing trouble, permitting it to return to its normal state, we surely must answer the question in the negative. No one speaks longer of malignant neoplasmata being the local expression of a constitutional taint. The disease begins in the very primitive cells of a part, and in its advance simulates most closely other infectious diseases of local origin. The question is, therefore, to be put in this manner: Can we ever so thoroughly eradicate a malignant neoplasm that in the future there shall be no recurrence of it locally, nor any remote manifestations attributable to its infection? This we certainly can answer affirmatively.

To say whether in a given case a favorable prognosis can be offered requires a consideration of its period of existence,

its seat, its anatomical and clinical characteristics, its extent, the local and constitutional complications, as well as the operative measures to be pursued. As the discussion of these important questions will fall to abler hands, it will only be necessary for me briefly to state a few established principles.

The greatest hope for the relief of malignant disease lies in its early, thorough removal, while the disease is still very limited in extent and before glandular infection is evident. As many cases have passed far beyond this stage before surgical attendance is solicited, the ultimate result is greatly imperilled. If the primary location of a malignant tumor be in an internal organ where signs and symptoms of its existence are most obscure, or whenever its character cannot be well defined, as in the thyreoid gland, early operation is out of the question.

A tumor which in a brief period of time has attained great size and exhibited unusually malignant tendencies, does not present as favorable an outlook for future exemption as does one whose growth has covered a long period, and where indications of local and general infection have long remained absent.

The occurrence of the primary growth in a part thoroughly accessible, and whose site forces its early recognition by the patient, leads to most favorable results. Thus in the lower lip 30 to 50 per cent. of the afflicted are cured. Appearing where with difficulty it can be entirely removed, its thorough eradication is all but impossible. Malignant tumors of the upper jaw present, therefore, but little to encourage operation. When, farthermore, the removal of a malignant neoplasm demands an operation in itself dangerous, the probability of success is small.

In his recent work upon "The Operative Surgery of Malignant Diseases," Butlin strongly denounces the very serious but so called brilliant operations of recent times for the relief of malignant disease. He refers to statistics of extirpation of the larynx, removal of malignant tumors of the kidney, of

the uterus through the abdominal wall, cancerous thyreoids, and so on, 364 cases in all, of whom 238 died in consequence of the operation. "Battles, shipwrecks, and railway accidents," says he, "are mild and merciful compared with some of these achievements of modern surgery." But it is not my intention to enter upon a discussion of operative procedures.

Without extending my remarks farther, it can safely be said that where by an operation a malignant neoplasm, which has not awakened secondary infection, can be thoroughly removed, we may hope for permanent relief. True, people may, after years, again become the victims of malignant disease, just as they may twice have pneumonia, but the two attacks need not be more closely related to each other. Great loss of tissue or sacrifice of limbs may be necessary but the disease is wholly removed.

QUESTION VII.

WHAT IS THE RATIONALE OF THE RECURRENCE OF EXCISED NEOPLASMATA IN DISTANT PARTS OR IN THE VISCERA?

QUESTION VIII.

WHAT IS THE EXPLANATION OF THE TENDENCY IN CERTAIN NEOPLASMATA TO INVOLVE SECONDARILY NEIGHBORING LYMPHATIC GANGLIA?

Discussed by

JOSEPH D. BRYANT, M. D., of New York County [who also considers Question 13].

LEROY J. BROOKS, M. D., of Chenango County [who also considers Question 13].

DR. JOSEPH D. BRYANT.

These and kindred queries have been made audibly and inaudibly for many years. The acute clinicians of the past have propounded them to the correspondingly learned pathologists of their time. The skilled surgeons, too, in addition to this, have silently interrogated their own experience and that of others for the correct answers. The unfortunate victims of this disease have anxiously addressed the last question of this series to any and to all who might perchance offer them encouragement and consolation in their affliction. And now at the latest moment, after these years of thought-

ful consideration given to them by master minds, the questions are asked again; therefore

> "Together let us beat the ample field,
> Try what the open, what the covert, yield."

For the purposes of this discussion it is proper, I think, to limit consideration to malignant neoplasmata alone, since these are the growths that excite the greatest apprehension, and call for the most judicious opinions and treatment. In this connection the expression malignant is understood to apply to the neoplasmata that are malignant by reason of their inherent nature, rather than by reason of certain destructive changes that may occur in growths irrespective of their nature, whereby the strength of the patient is sapped, and death finally ensues from exhaustion dependent on septic and other secondary influences.

That a malignant neoplasm of a similar character as the one excised may occur in a part distant from the seat of the excision is a fact too well and too long recognised to require even a moment's consideration at this time; still, the exact reasons for this occurrence or recurrence are yet unsettled. It is aptly said,—"The whole creation is a mystery, and particularly that of man." It might well be said, and as aptly, that normal vital force is a mystery: hence perverted vital force is alike mysterious.

It seems to me to be hardly necessary to give an entirely separate consideration to each of the first two questions allotted to me (seven and eight of the series). They are interdependent, for, when the "rationale of the recurrence of excised neoplasmata in distant parts" is stated, it will be seen that the explanation of this fact will comprehend all that is reliable regarding "the tendency of certain neoplasmata to involve neighboring lymphatic glands." The latter occurrence is but a well defined step in the course of the more extended journey of the former. There are two genera of recurrent neoplasmata to which it is particularly desirable that attention be called, viz., carcinoma and sarcoma. These

genera represent to the fullest extent the phenomena of the inception, cause, and termination of malignant growths. It is advisable at this time to recall some of the theories regarding the reasons for the occurrence and spread of carcinoma. It will be noticed that these propositions are of both a diverse and an interdependent character.

1. That carcinoma is the expression of a specific blood condition.

2. That a morbid material is present in the blood, which, coming in relation with appropriate tissue, enters into combination with it and causes the growth of the tumor.

3. The dyscrasia theory;—the theory that the disease has its origin in the constitution at large, the tumor being only the local manifestation.

4. That the disease is purely local in its nature, arising from a local embryonal or idiopathic point of departure.

5. That it is due to a constitutional predisposition not dependent on dyscrasia, in the ordinary acceptation of the term.

6. That it is due to perverted nervous influence. This is a curious but not a rational theory.

In addition to these can be added a more modern theory—one that is attracting much attention at this time, viz.,—

7. That malignant growths are of an entirely local origin, dependent on a specific local virus, endowed with characteristic bacilli.

There are many examples of this presumptive contagion cited, which, to say the least, afford somewhat startling evidence in favor of this last theory, since they can hardly be referred alone to the strangeness of coincidence.

If carcinoma and sarcoma were the expressions of a specific blood condition, the peculiar morbid blood state should then antedate the appearance of the tumor, and its existence should be quite as well marked before as after the appearance of the tumor. The fact is, the tumor, when external, always antedates the appearance of a depreciated blood state, often for some time.

The removal of a growing carcinoma or sarcoma may be followed by complete recovery from the disease, the patient maintaining perfect health thereafter. This could hardly happen if the occurrence of the disease had depended on a specific or peculiar blood state, unless it is assumed that the only tissue of the body susceptible to its influence had been removed by the operation, or that the blood had become pure, or that the tissues had become tolerant of the poison.

If carcinoma or sarcoma depended on a specific or peculiar blood condition, either of the growths should appear in different parts of the body, in like tissues, at about the same time; and, too, each should recur, after removal, in a tissue similar to that which was first attacked, as in the opposite mammary gland, etc.

That these diseases have a hereditary bearing of importance, dependent either on tissue transmission or on some other process, it seems almost impossible to deny. The percentage of cases of cancer having hereditary association has been variously estimated. Sir James Paget expressed the belief that at least in one in three of the afflicted heredity could be traced, and traced, too, in such as had undoubted cancer. It is important to remember, in this connection, that not a few die of cancer in whom its existence has not been suspected. But why spend farther time "carrying coals to Newcastle"? To-day the mass of evidence seems to point to the following facts:

1. That carcinoma and sarcoma depend entirely on local causes for an existence in many cases.

2. That they are more commonly a local manifestation of an inherent peculiarity of the tissues, called forth by some form of irritation at the seat of development.

Be this as it may, the local manifestations of these diseases are the first to be seen; they appeal first to the fears of the patient, and for these reasons they first invoke the wisdom of the medical profession. It is these manifestations that present to the mind of the medical profession the only point of departure from which to begin successful treatment. In

this connection the question can now be asked, "How do malignant growths infect neighboring and distant parts?" There seems to be no doubt of the fact at this time that either the nuclei, or the granular matter of the cells peculiar to malignant growths, or the cells themselves, are the agents that directly or indirectly cause the spread of the disease from the primary point of occurrence. These agents of infection are carried from the primary site by the lymph-vessels associated with the growth, and they often find a resting-place in the lumen of these vessels, and are checked in their journey through them by the lymph-glands nearest to the point of departure. These infective agents are also conveyed directly to distant parts or viscera by means of the capillary blood-vessels, whose open mouths are frequently to be seen within the intimate structure of a highly vascular malignant growth. The cells of sarcomata especially possess an inherent tendency to "move on," and to otherwise extend their area and influence by increase of their number through the recognised process of cell-growth. By reason of these latter facts the normal tissues that surround malignant neoplasms become so infiltrated with the elements of the growth, that ere long they too form a part of it, and exercise in turn a like influence on the neighboring structures. In sarcomata the blood-vessels are the chief means of the spread to distant parts, due, it is thought, to the better accommodation afforded by the blood-vessels to the size of the cells of the growth, and also to the intimate relations existing between the blood-vessels and these cells.

Sarcomatous tumors, therefore, spread more rapidly than the carcinomatous, and occur secondarily at greater distances from the initial growth. The cells of these growths reach their final resting-places more commonly by means of the blood-current, which is rapid transit indeed as compared with the movement in the lymph-vessels, irrespective of the frequent interruptions of the latter by the lymph-gland locks of these vessels.

If such is the method of the spread of malignant tumors,

it naturally ought to follow that the direction, extent, and rapidity of the spread will be in direct relation with the degree of vascularity of the growth, the richness of the region in lymphatics, and the density of the surrounding tissues, other things being equal. These conclusions seem to be well substantiated by clinical evidence, for the more vascular the tumor, the more rapid is its growth, and the sooner secondary processes of a similar nature are established in distant parts; the richer the contiguous structures are in lymph-vessels and glands, the sooner the disease establishes secondary footholds in the neighborhood and the more difficult the eradication becomes; the denser the surrounding tissues of the growth, the slower are the processes of infiltration. The influence of this density is often well shown by the irregularity in the outline of a rapidly developing tumor, which extends more rapidly in the direction of the least resistance. Malignant growths can be produced also by inoculation and self-inoculation. These methods of causation are believed to be strong arguments in favor of the specific-virus theory of the causation and dissemination of malignant formations. Malignant growths vary from each other in the rapidity of dissemination, a fact which appears to depend largely, indeed, on their anatomical peculiarities; as, for instance, abundant granular matter, small cells, great vascularity, and loose structural arrangement of the tumor and of the surrounding tissue, are some of the conditions that are associated with rapid dissemination.

It now remains to be said that the carrying from the initial growth, to a near or distant part, of any of the infecting elements of a growth, by either of the means of transmission already mentioned, causes the development, in the part at the place of lodgement, of a growth similar in all respects to that from which the infecting agent took its departure. In this secondary depot, processes and changes take place similar to those that had occurred in the primary one, and it in turn disseminates its virulency to the parts allied to it by associated function or contact.

Thus far in this paper the constitutional aspect of the question of the production and dissemination of malignant neoplasmata has not been given a hearing. The lack of time and space will not permit me to discuss this phase of the disease up to the point of the belief that I shall express in the matter. Malignant disease as such is not inherited; but analogy alone in respect to transmitted similarities of a different kind teaches us that the tendency to malignant disease, as expressed by the vulnerability of the cell-tissue to the peculiar or exciting influences of the growth, is transmissible from parent to offspring.

Question 13. *Are malignant neoplasmata ever cured?*

This question can be safely answered in the affirmative. The efforts of nature alone are reported to have effected a cure in rare instances. The endeavors of the surgeon, too, have been followed by a fair percentage of cures. The site of the growth, however, has much to do with the result in this respect.

Professor S. W. Gross expressed the belief that 9 per cent. of mammary cancers could be cured by thorough operation when employed at the proper time. Butlin reports 38 per cent. of the cases of cancer of the lower lip to have passed the three years limit of cure without return. Gross felt assured that a year might be added to the lives of patients by operation on those unfavorable for cure.

It is not my intention to cite cases of real or presumptive cure that have come under my personal observation, since they will add nothing important to the results that have just been mentioned. It is my intention, however, to embrace this opportunity, under this heading, to speak in emphatic terms of the measures which I think necessary to be adopted to gain the full benefit to the patient of the surgeon's ability to cope successfully with a larger number of cases of this disease.

This consideration will be divided into the following headings:

1. Early diagnosis of the nature of the morbid growth.
2. Prompt and thorough treatment of it.

The early diagnosis of malignant disease will require the timely action of three distinct agents: (1) of the patient; (2) of the medical attendant; (3) of a microscopical expert. The natural inclinations of a member of the human family who is in the possession of a rational mind lead him to resent the idea of the occurrence of malignant disease in himself or in one of his own. He will not infrequently seek advice from the sources which will afford him the greatest personal comfort, irrespective of the wise promptings of his own judgment in the matter. This course, on his part, is due quite as much to pride and sentiment, as to dread of being informed of the actual facts of his case. The medical attendant can do very much indeed to rectify this unfortunate state of affairs. He should consider it a case of *emergency* in the full sense of the term, and advise the patient of a course of action that will meet the full requirements of it. But how does the medical attendant in a multitude of instances fulfil his duty in this respect? He, too, is often controlled by sentiment, or by a habit of professional moral syncope, that permits him to shirk unpleasant responsibility.

Sentiment causes the physician to encourage the patient in the belief of non-malignancy; to smile at his fears, if he has any, and, whether he has them or not, to say to him,—"Come in a week or two if it is no better," or, "Come and see me again after a while," or, "Do n't think it amounts to much; any way, do n't worry," and at the same time he recommends something simple "for the blood," or for external application. A physician might do worse than this, and there is great danger that he will. He might disguise the characteristics of the morbid growth and accelerate its development by the application to it of some form of caustic, believing it to be good treatment in any case. Professional carelessness—better named professional shiftlessness—may

permit the medical attendant to omit obtaining the history of the case, or omit the examination of the diseased part except with a glance. Such methods of procedure as these are culpable, whether the patient is afflicted with a real or with a fancied disease. A hospital surgeon, or one with a private *clientèle*, can recall many instances of consultations with victims afflicted with malignant disease in whom the opportunity of affording more than temporary relief has been sacrificed by the ignorant or sentimental dalliance of a medical attendant.

Patients should be educated in the belief that "an ounce of prevention is better than a pound of cure." The adoption of this line of action will cause patients to seek information whenever anything unusual happens to them, and then the physician who performs his Christian and professional duties well will solve the nature of the affliction at once, or as soon as possible thereafter. The patient who is left largely to his own discretion by the emasculated admonitions, "Drop in when you are this way," or "when you come to town," etc., is lured into a sense of safety that will lead him to stifle the wise promptings of his own good judgment.

If the physician finds himself unable to determine the nature of the growth by the means at his command, the aid of the microscopist should be sought at once. It may be said that this aid cannot be had in all instances, and that it, too, is not conclusive. The instances when this aid cannot be had are very few indeed. The medical attendant has only to remove a small portion of the growth, if accessible, properly inclose it, and send it by mail to the nearest recognised authority on the microscopical appearances of morbid growths, with a statement of the part of the body from which it was taken, and of his suspicions regarding it. In a few days at most the answer will be at hand. It is proper to add, in this connection, that the inclosure of a fee for the examination will in no way delay matters, nor detract from the value of the opinion. As to the importance to be placed on the opinion, I think I may say that it should always be considered as

one of the determining factors of a diagnosis, rather than as conclusive evidence of it. In only rare instances in my experience has the microscope failed to decide the question for or against malignancy.

None but simple and unirritating applications should have been made to a suspicious growth prior to the completion of the diagnosis. If it be necessary to remove a suspicious growth, for any reason, before a diagnosis can be confirmed by microscopical examination, this aid should be sought as soon thereafter as possible, since the knowledge thus gained will become of great importance in estimating the subsequent treatment and final prognosis.

Treatment. The treatment should always be two-fold—constitutional and local. The former should be of a kind intended to strengthen the patient in every possible manner, in order that the healthy tissue cells of the patient's organism may be the better able to resist the influence on them of the cells and other products of the malignant growth. Special general medication, with the view of curing or delaying the progress of the growth, will prove elusive, and will be destructive, if it is employed to the exclusion of operative procedure. Let the maxim ever be, *Operate first, medicate afterward.* The use of the knife is the operative measure to which the patient should be subjected. The growth should be removed thoroughly by excision at the earliest possible moment after the diagnosis is made; and, if a doubt exist as to the nature of the growth, give the benefit of that doubt to the patient, and remove the growth at once. The earlier the removal, the better will be the chance of preventing and limiting dissemination. Any and every measure of treatment that will stimulate unnecessarily the flow of blood to the growth, or stimulate the action of the lymphatics in the neighborhood, should be avoided, for these results of irritation of the growth are directly productive of the dissemination of the infecting agents of the disease to the lymph-glands and distant parts by means of the blood and lymph currents associated with it. The knife meets the indications better than all other

means for the removal of malignant growths, for the following reasons:

1. It can be applied with precision at a greater distance from the growth than can any other measure.

2. It acts promptly and with less injury to contiguous tissues than any other agent, and without pain if anaesthesia be employed.

3. Healing takes place immediately when removal is done early and with proper care.

4. Neither irritation nor pain attends the healing process if the surgical indications of the wound have been carefully observed.

5. Cicatrization and deformity are less than from the use of caustics and other local agents.

The preceding are some of the practical advantages that attend the proper use of the knife for the removal of malignant growths with antiseptic precautions. The converse of these usually attends the use of caustic, cautery, and other means that are more slowly effective, and with the use of which, suppuration, ulceration, and sloughing, and their histological processes, antedate, and often complicate, the final healing. I am of the opinion that with an early diagnosis, prompt, repeated, and wide removal of malignant growths with the knife, a much larger number of lives will be spared, with a minimum of suffering to the patients. The surgeon's watchwords ought to be, *Cut early*, *cut often*, *cut wide*, *and remove contiguous lymphatic structures when practicable*, *whether diseased or not.*

DR. LEROY J. BROOKS.

Question VII. What is the rationale of the recurrence of excised neoplasmata in distant parts or in the viscera?

Theories of the purely local character of carcinoma are less tenaciously held than formerly, and it may yet be demonstrated that a previous condition of the blood exists, and that a local irritation produces the localisation of the growth only.

The diagnosis line between a benign and a malignant neoplasma, or between the benign and malignant stage of a given neoplasma, is far from being determined,—so far that it is not untenable to hold that a so called malignant neoplasma is malignant from its conception, and that the later developments are but a degree of the malignancy. It seems more of a question of the recognition of the elementary malignant conditions.

The answer, then, to the question before us, briefly stated, would be, that the recurrence depends either upon a certain general condition of the blood, or upon the presence of certain bacilli, not yet determined, which existed previous to the original growth, and continued subsequent to its excision; that the localisation of the recurring growth results from either a local disturbance in function, or other organic changes that serve the same purpose as an external blow or injury.

Question XIII. Are malignant neoplasmata ever cured?

Here, as before, the diagnostic line is so indefinite that neither theory nor statistics are of value, particularly such statistics as are gathered from others than the closest pathological students.

In answer to a circular letter asking the question, "Do you personally know of a permanent cure of a malignant neoplasma?" several replied Yes.

The answers to a second question, "By what method or process did you demonstrate the malignant character of the cured neoplasma?" showed that in two only of a considerable number was even a microscopical examination made; and the skill of the examination could be well doubted in one of the two. In fact, the diagnoses were generally made from gross characters or symptomatic evidences—measures by far too indefinite to give light upon so serious a subject.

The attempt to answer the question from personal observation rather than from published data will compel us to answer in a paradoxical way, *i. e.*, that malignant neoplasmata

are cured, if ever, if removed before they present recognisable malignant elements; that, if the latter have become so far developed as to be positively recognised by ordinary skill and the methods in common use, then they are not cured.

These conclusions are drawn from a limited field of observation; but I would repeat that I have yet to see, not a prospective, but an unmistakable, malignant neoplasma permanently cured by any process. I am not prepared to question the possibilities of such a cure, but firmly believe that in a large proportion of the supposed cures of malignant neoplasmata the growths were really but varieties of the semi-malignant or benign tumors. Nor should I hesitate to advise the complete removal of all malignant growths, on the same principle that we would remove a local tuberculous nidus with a hope of having an influence upon the general disease. It seems to me of more than ordinary importance that searching studies should be made in order to arrive at definite notions as to what constitutes malignancy, and, farther, to demonstrate a practical method for distinguishing such malignant characters at a time when it is feasible to remove them from the body.

The rule to remove all suspicious or possibly malignant growths may help us in the result, but not in getting a positive, scientific knowledge as to whether truly malignant neoplasmata are ever cured.

QUESTION XI.

WHAT IS THE AVERAGE DURATION OF LIFE FROM THE TIME OF THE APPEARANCE OF A MALIGNANT NEOPLASMA WHICH HAS NOT BEEN TREATED?

QUESTION XII.

TO WHAT EXTENT DOES THE EXCISION OF MALIGNANT NEOPLASMATA PROLONG LIFE?

Discussed by Chas. W. Brown, M. D., of Chemung County.
[Who also considers Question 13.]

I have had but little experience in the treatment of this class of cases, but will give as my answer the results of excision in those which have been treated in that manner.

September 16, 1873, amputated arm near shoulder for J. A., aged 60 years, for scirrhus of right hand, which made its appearance two years before, and at the time of operation involved nearly the whole hand and the lymphatics to the middle of the arm; the bones of the hand were changed to the same appearance as the rest of the cancerous mass. There were no indurated glands discovered above the point selected for the amputation. He made a rapid recovery, and last summer I heard that he was yet in good health, and had no indication of the return of the disease. The hand and arm were presented to the Tioga Co. Pa. Medical Society, and dissected by the members, and the diagnosis confirmed.

Mrs. R., aged 32. Saw her in June, 1874. Three years before, she noticed a small tumor over the right scapula near the inferior angle. It enlarged slowly, and after the first year was quite painful; in about two years was as large as an egg, and became very tender on the surface, and three months before I saw her it commenced to discharge a watery, irritating substance, and there was retraction of the integument over a portion of the mass. When I examined it, I found it firmly attached to the

scapula, and two and one half inches in diameter, partly filling the infraspinous fossa. There was an indurated gland in the axilla, which was removed, and the tumor was dissected out. It was connected with, and had changed the lower border of, the scapula, so that it had the same appearance as the growth, the bone being so soft in places that it could easily be crumbled up between the thumb and finger. The scapula was divided by the saw up to a point where it was normal in appearance, removing about one third of the whole bone; the parts were thoroughly cleansed, and closed up as well as the scanty covering would permit; apparently healthy granulations sprang up in the bottom of the wound, and in two months it was entirely healed over; the pain ceased, and it gave her no farther trouble. She left that section of the country a year later, and I heard that she died of pneumonia two years after the operation, without any return of the growth.

November 28, 1886, I was called to see M. J., a girl aged 1 year and 9 months. She was a bright, healthy-looking child up to this time. Her mother told me she had been restless through the night, and had complained of pain in her left eye, and that for the past week she had noticed her frequently putting her hand up to her eye and rubbing it. At this visit I made but a superficial examination, and found the pupil slightly dilated and not readily responding to light; there was increased hardness of the ball; the conjunctiva appeared normal; the pain was entirely relieved by the application of warm poultices for a few hours, and she seemed to feel as well as usual. Two weeks later she suddenly became very ill in the night, and had a copious diarrhoea which lasted a day or two. At this time she made no complaint of her eye; the pupil had become permanently dilated and insensible to light, and vision in this eye was entirely lost, though the mother insisted that she could see until it was demonstrated by covering the well eye.

Dr. Tewksbery was called in consultation, and we found on examination that there was haemorrhage behind the retina, considerable detachment and atrophy, with displacement forward. The intraocular tension was increased, the pupil fully enlarged, and, shining from the bottom of the eye, the characteristic bright, glistening, yellowish-white reflection could easily be seen.

The parents were informed that the eye was permanently blind, and the early removal of the globe was recommended, but did not meet with their approval; and so the case for the time passed out of our hands, and was treated by a travelling pretender, who promised to restore the eye perfectly in a few weeks for a large fee in advance, and warranted a cure.

The next I saw of the case was August 20, 1887, when I found the eyeball considerably enlarged; hardly a trace of the iris could be seen;

the sclerotic coat was very white, and showed no congestion; the whole cornea had a dark, shining appearance, and when a strong light was thrown upon it numerous blood-vessels could be seen in the anterior chamber. Her face was pale and her appetite was poor: she complained of pain in the left side of her head. I again urged the parents to have the globe removed; and after some delay in completing the arrangements, they concluded to take her to Buffalo to see Dr. Lucien Howe, who wrote me on September 2 as follows:

Mrs. J. brought her little daughter here a couple of days ago, with the letter which you gave them for me. Even before I saw that, I had virtually committed myself to the same opinion which you expressed; so that she was evidently glad to know that the two agreed so exactly. I always take care to insist on the impossibility of recognising the glioma at this very early stage with a child of that age, so that in general she felt quite as reconciled to my advice as any mother could be. Accordingly the enucleation was made day before yesterday afternoon. On reaching the optic nerve, however, I found the growth had pressed backward outside of the globe and filled a considerable portion of the orbit; such a complication appeared rather discouraging at first, but in spite of considerable haemorrhage every particle of the growth which I could see was removed, and, in order to be as thorough as possible, I then cauterized the entire apex of the orbit to a considerable depth. Of course we know the tendency of these growths so well as to be unable to express very definite opinions; but to-day the lids appear perfectly normal, and the interior of the orbit quite as natural as one could expect after so severe an operation. The mother will remain a short time, and I expect to see her again in a couple of weeks, so you may be sure every possible effort will be made to obtain as good a result as is possible in such a case; but at the very outset I told both the parents that this form of sarcoma not only had a tendency to appear in the other eye, but also involved the question of the life of the child.

On September 14 Dr. Howe again wrote,—

As for the little patient, I can now, I think, report her much better. The family met me yesterday at Hornelsville, and as the wound had not healed as well as it should, and as there was a suspicious spot just near the optic nerve, I gave her an anaesthetic again, and removed a considerable portion of the tissue still remaining in the orbit. This time I hope the source of danger is done away with, although I was careful to tell the parents that possibly more might be necessary if there was the least sign of return of the growth.

On the 20th of October I saw her, and found she had improved in general appearance very much, had gained in flesh, and there had been no discharge from the orbit for a number of days. On the day before, the mother had noticed a fulness appearing under the lids, and on examination I found what appeared to be a thickening and congested appearance of the palpebral conjunctiva; both lids were involved; the upper was greater than the lower, so that the lids when closed had about the same appearance as the well eye when closed. On parting the lids as far as I

was able to, I could discover no growth springing from the stump of the optic nerve. Mild astringents were applied, but the swelling increased rapidly, and there was a watery discharge which was often seen trickling down the cheek. These changes were explained to Dr. Howe, and on October 21 he wrote as follows:

I am very sorry to hear such a suspicious report in regard to our patient. It is quite possible, of course, that there may be some swelling of the point where the cancerous growth first formed; if that is the case, it is a cause for anxiety for us all.

The growth rapidly increased in size, and a central portion made its appearance and caused the lids to roll out. This middle growth seemed to spring from the bottom of the orbit. The pain increased, as did the tension on the swollen lids, so that full opiates were required to obtain sleep. The conjunctiva was so oedematous that it was punctured in several places, and discharged quite a quantity of watery fluid, which relieved the tension considerably for a time.

October 26th, the growth had attained such great size that the lids were stretched so that their edges were as thin as paper; the little patient suffered great pain in the side of her head, and at 4 P. M. had a convulsion which was attributed to the pressure of the tumor. To relieve this, the external canthus was slit open, which allowed the growth to emerge from the orbit, and it then grew straight out; there was very much less pain; the lids became dark and livid, and soon were so nearly like the growth that it was difficult to tell how far they extended out on the tumor. The blood-vessels grew very large and dark colored, and occasionally ruptured, the haemorrhage being often so great that she was nearly exhausted before it could be controlled. The haemorrhage first took place from the apex of the tumor; and soon after the rupture of these enlarged vessels occurred, warty growths would spring up at the point of rupture, and these rapidly increased in size until they were three fourths of an inch in diameter.

No more convulsions occurred until January 27th, in the forenoon, when she was seized with a convulsion, which was soon followed by one after another, with but a few minutes intervening, until she died the next morning about three A. M. She did not become conscious for a moment after the first convulsion the day before.

The following day, assisted by Dr. Ross, I removed as much of the growth as would hold together, and present it for your inspection. After dividing the outer shell, a large part of it was so soft it ran out, and left in the bottom of the orbit a thick net-work of blood-vessels that nearly filled the cavity. The soft part of the tumor had the appearance of softened brain tissue.

At the time of her death the tumor measured $2\frac{1}{2}$ inches forward from the cheek and 3 inches in diameter, and occupied the space from the

middle of the nose to the lobe of the ear, and from the middle of the forehead to below the corner of the mouth, so that it was difficult to give her food.

The cavity of the orbit was cleansed and filled with cotton, and the remnant of eyelids stiched together, which improved the appearance of the face very much.

Excision of malignant neoplasmata, under favorable circumstances, such as early removal of the growth with incision carried well into the healthy tissue, will in a vast majority of cases prolong life; and the time for which life is prolonged by surgical interference depends largely upon the location of the tumor, and the extent of infection of surrounding tissues by absorption, or metamorphosis. If the growth be on one of the limbs, as in the first case recited, and the limb be amputated, it would be liable to answer Question 13 in the affirmative. And if after excision or amputation the growth does not recur in fifteen years, or until the patient dies from some other cause, I should term it a cure.

QUESTION XIII.

ARE MALIGNANT NEOPLASMATA EVER CURED?

Discussed by

William H. Carmalt, M. D., of Connecticut.
Stephen Smith, M. D., of New York County.

DR. WILLIAM H. CARMALT.

What I have to say amounts really to saying simply ditto to a previous speaker who discussed the question of what constitutes malignity, inasmuch as he spoke of the essential feature of malignity being in the fact that the growth is of a low type of organisation. It means simply that the cellular tissue, whatever it may be, no matter whether of the connective or epithelial type, does not arrive at a state of maturity, but remains practically in the embryonic condition. In that condition it develops and grows to the condition in which we recognise the tumors.

We should divide, I think, our malignant tumors—we do divide, and should understand distinctly how we do so—into two general classes, those classes being the connective tissue and epithelial types. If we could get rid of a certain indefiniteness in our nomenclature, we should certainly make an advance in studying these tumors. We should conform our nomenclature to the suggestions made by Dr. Biggs in relation to the histological constituents.

There have been one or two expressions used to-day to which I think it is worth while to refer. My friend, Dr. Nancrede, spoke of homology and heterology. As we study what has been meant by heterology in times past, we find we go through a wide range of things. I was reminded, when he used that term, of the reply made by Dr. Bellows in regard

to his theology. He was asked the difference between orthodoxy and heterodoxy. He replied, "Orthodoxy is my doxy, and heterodoxy is the other man's doxy." These terms are very loosely used.

There is one feature in regard to these growths that I think we should bear strictly in mind, that is, that they do not run into each other. No sarcoma develops from carcinoma, and no carcinoma develops from a sarcoma. We should always define what we are speaking of when we use the term malignancy. Clinically we appreciate it as a tumor which generalises. I think that expresses it better than anything else. It is not multiplicity, nor size, nor manner of growth; it is the fact, more than anything else, that it will invade distant organs, and this in two ways,—by the blood-vessels and by the lymphatics;—the sarcomas, as Billroth pointed out, almost always by the blood-vessels, the carcinomas by the lymphatic system. We want to deal with these tumors, and should know, therefore, how they are going to spread; what we are to attack in operative intervention, because there is nothing but operative intervention that will cure them. There is, however, a point that I have never become perfectly clear about in my own mind,—that is, as to whether there is a constitutional taint in the causation of tumors. I have no kind of hesitation in accepting the local origin of the growth as being influenced by some form of local irritation; but if there be no constitutional taint, how comes it that the same kind of irritation does not produce it in all cases? Take our epithelial lip from smoking pipes: why do not all such smokers get cancer of the lip? There is no doubt but that that is the origin of a great many; but why not of all, if there be no constitutional taint? And the same thing holds good with the sarcomas. When we say that the tumor recurs—sarcoma particularly—because it has not been entirely extirpated, I think we frequently make a mistake. The tumor may have been absolutely extirpated,—but that individual does not take on mature growth: the person does not mature. Instead of forming well developed fibrous tissue in the cicatrix, the

growth stops at the embryonic stage. There is from the round cell to the spindle cell, and from that to the fibroid growth, a steady increase in the development, a steady maturity, the height of the development being a true fibroma. We see the process reversed sometimes. How many of us have operated on fibromas, but have been, by reason of their position, unable entirely to remove them. Take the instance of fibrous tumors—fibromas—starting from the sphenoid bone, at the base of the skull: they grow very slowly, and do not particularly distress the patient until they get to be so large as in some way to interfere with his comfort. They are then operated upon, but not entirely removed. Now the result is that they start again; but while the first tumor showed by microscopic examination nothing but mature fibrous tissue, the next growth, the recurrence, shows sarcomatous elements, and grows more rapidly, and the next time it is operated upon the recurring growth is found to contain spindle cells, and the third time round cells, and then perhaps the operation is not repeated and the patient dies from a so called malignant disease; but it is the conversion of a former benign growth into malignant growth, from the fact that the growth does not arrive at maturity, not because there was anything malignant in itself.

I must apologize for having said anything, inasmuch as I can do little more than repeat what others have said before. But there is one question in regard to the cure—if we use the term—of these growths, particularly of the sarcomas. While there are clinical evidences to show that they sometimes do disappear, we are perhaps most of us familiar with the fact that erysipelas will cause the absorption of a well marked sarcoma. I have met such an instance, of a sarcoma—a tumor, at least, having remained apparently quiescent for several months; the patient was attacked with erysipelas, and during or following the erysipelas the sarcoma entirely disappeared. I remember several years ago having the opportunity of studying the history of a case which presented itself to my observation first in the New York Eye and Ear

Infirmary,—in 1865, I think it was,—the patient being sent from the German Infirmary, with a growth in his iris. Dr. Simrock, who sent him, called attention to the existence of a growth on the ear, where it had first come to his notice, and then to the fact that the man's skin was strewn over with similar growths. While he was under observation the tumor entirely disappeared, and at the same time others cropped out on the skin. After a time a similar tumor appeared on the other eye, and that again disappeared. In the meantime they were appearing and disappearing over the skin. The man was under observation in various hospitals here three or four years, and died at last in the Charity Hospital. I think Dr. Watts made the autopsy. The history had been that of the continuous appearance and disappearance of the tumors, which had several times been cut out and examined. The whole skin and mucous membrane were strewn through with these tumors. His liver was filled with them, his bladder had several, there were two in his urethra, there were several on the dura mater. In fact, they were strewn everywhere. If such a history as this is not constitutional, what can we call it?

With regard to the cure by operative interference, I can only repeat what other gentlemen have said, that there have been instances where the tumor did not return in several years after the removal. No doubt our friend Dr. Moore, whose experience extends over a great deal longer period than that of any of us, can tell of as good instances as Dr. Gouley related. Is it fair to call those recurrences? Is it not more scientific to say that the irritation has started up in the place again? that there has been another focus of irritation which has caused these second or third growths, fifteen or twenty years after the original tumor has been removed? I agree with the statement that a carcinoma should be removed entirely, and I think if it is thus removed it will not return; but it is a question of which we are very uncertain as to whether we do remove it entirely. The only thing we can do is to make sure that the tumor, as far as we

can recognise it, shall be removed and all its avenues of connection be cut off, the lymphatic glands and intermediary vessels extirpated along with the tumor, and the glands next to it.

DR. STEPHEN SMITH

Remarked that he had not been fortunate in being able to follow cases of cancer, on which he had operated, for any lengthy period. In general the disease returned within eighteen months, and the larger number of cases of which he had positive knowledge survived less than four years from the date of appearance. He regarded operative procedures as always advisable when the growth could be reached and safely removed. The operation not only prolonged life as a rule, but it rendered the remaining life hopeful and frequently comfortable. He submitted the following histories of cases in which life had been unusually prolonged:

Epithelial growth (rodent ulcer) of the face. Removal and transplantation of skin. No return in thirty-four years.

Mrs. S. had had good health to the age of 61 years; a brother died of epithelioma of the lip at 78 years of age; no other evidences of heredity. She had noticed a small irritated spot on the right side of her nose many years; at times a scab would form, which she would remove with oil; when removed the surface would be red and inflamed for several days. At the age of 61 years the surface ulcerated, and the ulcer began to spread, with everted edges. Within one year the ulcer had attained a diameter of half an inch, and had reached the bridge of the nose. It was then excised cleanly; a flap from the cheek was dissected up, the pedicle twisted, and the flap stitched in its position. Union was prompt, except at one point, where there was slight erysipelas. She quickly regained her health, and has remained well to the present time, a period of upward of thirty-four years. She is now in her 96th year.

The excised portion was examined by a competent microscopist, who reported that the mass was composed of epithelium, and was an epithelioma in character.

Cancer of the breast, remaining stationary six years under the constant application of ice.

Miss S., an unmarried lady, without any hereditary tendency, at the age of 50, noticed a small, hard tumor in the left breast. It was situated

at the upper and inner border of the gland. During the following eighteen months it appeared to remain quiescent and without perceptible change. It then began to enlarge very markedly, and, as she persistently refused to have any kind of operation performed, she was advised to apply ice continuously. She took to this treatment with great earnestness, and succeeded in maintaining the tumor, and the parts adjacent, in a condition of constant cold day and night. For several months the tumor showed no change; then the area of outlying hardness began to diminish; in the course of three years the mass had diminished to one third its size when the treatment began. The tumor was now about an inch and a half in diameter, and of stony hardness. The general health continued to be perfect. The ice bag was applied with remarkable assiduity summer and winter, and even during a severe attack of pleurisy. There was no other change perceptible in the growth, until the sixth year of the application of the ice, than the retraction of the skin and a slight ulceration over the tumor. The tumor now began to enlarge very noticeably in every direction. She steadily refused any cutting operation, but consented to the use of caustics. These were applied several times, and a considerable portion of the growth was destroyed. She declines farther active treatment; the tumor is now of a well marked cancerous character; the broken surface is healing; the general health good. The tumor remained about six years in an apparently shrivelled and lifeless state. The ice was first applied when the growth was active.

A small-cell sarcoma of the shoulder. Removal eight times. Amputation at the shoulder-joint. No recurrence for eighteen years. Development of a uterine tumor.

This growth was found in a young lady 18 years of age. It appeared on the most prominent point of the left shoulder. From her statements it was learned that the growth was first removed when she was five years of age, and that it had been removed seven times, the intervals varying from eighteen months to two and a half years. It was the seat of excessive pain when growing. It had now reached such a large size, and so thoroughly implicated the parts about the upper surface of the shoulder, that the only practicable operation was amputation at the joint, and making a flap from the soft parts under the joint. Amputation was accordingly performed, and a large flap turned over the joint and attached above. The wound healed readily, and she recovered good general health. She has remained well eighteen years; but when last seen, on visiting the city for advice, she was suffering from a uterine growth, the nature of which had not been made out.

Removal of cancerous breast by caustic arrows. No return in eight years.

The patient was a German lady, aged 45, married, in good health. The tumor occupied the central part of the left breast, and had produced

retraction of the nipple. The operation consisted in surrounding the tumor with caustic arrows. The caustic used was chloride of zinc. The arrows penetrated under the tumor sufficiently far to completely isolate it with the slough. The mass fell out on the seventh day, leaving a healthy, granulating surface. The recovery was rapid, and the wound was closed by a soft and yielding cicatrix. The tumor proved on examination to be a scirrhous cancer. This lady went to Germany eight years after the operation, without any evidence of the return of the growth.

DR. WILLIAM S. TREMAINE.

Question XIII. Are the malignant neoplasmata ever cured?

If the malignant neoplasmata were all alike, and I were required to give an answer from my own observation, I should say No.

I live in a locality where malignant growths are so prevalent that a surgical friend characterized it as the "Tropic of Cancer," and when I recall the numerous cases I have seen in the past ten years—in hospital, consulting, and private practice—the name is an appropriate one. If cancer is caused by a microbe, the conditions for its growth and development must be peculiarly favorable in Buffalo and vicinity.

There is scarcely anything more tiresome to me than listening to a long array of statistics and narratives of cases; so I have no intention of inflicting either, but ask my Fellows to place whatever value they choose upon the conclusions I have come to. I assume that my experience does not differ widely from that of others similarly situated.

The question is difficult to answer accurately. Few men, unless they have a registrar and a corps of detectives under their control, can follow up their cases to learn the ultimate result. Of scirrhus, out of more than one hundred cases I cannot recall one at the present writing that has not returned. All that I have been able to trace have returned in from three months to three years. Had this discussion taken place six months ago, I might have reported one case, where I removed the breast for scirrhus, by very radical operation and cleaning out of the axillary glands, three and a half years

ago, as cured; but, alas! the woman presented herself a short time ago with a recurrence of the disease in the cicatrix and cervical glands.

I have no history of a case under my own observation that did not sooner or later recur. I have asked a number of my surgical friends how it was with them. The reply was,—"I cannot recall any case as cured."

Of that form of this malignant neoplasmata known as sarcoma, my observation has been that it nearly always returns, the varieties where the cell element predominates returning rapidly after operation, though where the fibrous element is in excess the return is less rapid. I can remember a few cases where there has been no return after the lapse of several years. "A mistake in diagnosis," I fancy I hear some one say. Possibly, indeed probably, for mistakes in diagnosis are not infrequent, even in this preëminently scientific era.

Turning to the epitheliomas of the superficial kind, the picture is brighter. Many cases which I have removed by the knife or by caustic have not returned. Among these may be mentioned two cases of epithelioma of the rectum, operated on, one (private patient) September, 1884, one (hospital case) November, 1883. To sum up, excluding the epitheliomas and cases where the diagnosis is uncertain, I answer that the malignant neoplasmata are never cured by any means at present known to me.

Question X. What are the indications and contra-indications of the excision of neoplasmata?

Here, again, it is difficult to generalise. Much must depend upon the kind and locality of the tumor. The carcinomata must be considered apart from the sarcomata, and the epitheliomata by themselves. Indeed, speaking of the latter, I should at once dismiss them with the statement that where the location or extent of surface does not anatomically forbid, the indications are to excise every case; those that for the above reasons are not suitable for excision may be treated

by caustic paste, unless their extent and the involvement of neighboring glands render the case hopeless.

Returning to the sarcomata and carcinomata, it is difficult to lay down any general rule, so much depends in this, as in every other department of medicine, upon the peculiarities of each individual case. I think it fairly well proven that cancer is primarily a local disease; but patients do not as a rule die from the local affection, but from constitutional infection. Therefore I advocate early removal of all supicious growths. When the disease is advanced, the lymphatics involved, and the constitutional infection marked, excision is of doubtful propriety; but here, again, there are reasons why an operation is advisable. Suppose a case of malignant disease of the uterus: when one recalls the discomfort and loathsomeness of this, is not vaginal hysterectomy justifiable? True, there is no hope, in advanced cases, of prolonging for any great time the life of the patient; but the condition which renders her loathsome to herself and her attendants is removed, and recurrence is likely to take place in some internal organ.

There is a small percentage of rapidly growing malignant tumors that should better not be interfered with. The same rule would apply to another class of tumors, which increase very slowly in persons of advanced age. An example may be found in that form of malignant neoplasm known as atrophying scirrhus, which, while slow in its progress, and found in persons of advanced life, is invariably accompanied by deposits in the viscera,—generally, according to those cases which have come under my observation, in the liver. In such cases I believe excision to be contra-indicated, as useless for any purpose. Excluding such cases, and those where the anatomical difficulties are too great to be safely dealt with, I think excision is indicated in ALL cases of suspicious growths. The mortality of surgical operations has been so markedly reduced, and the subsequent pain of the operation-wound so mitigated, thanks to recent advances in surgical technique, that they scarcely need to be considered.

QUESTION XIV.

WHAT IS THE RATE OF MORTALITY FROM MALIGNANT NEOPLASMATA, AS COMPARED WITH OTHER DISEASES?

Discussed by ALFRED L. CARROLL, M. D., of Richmond County.

A computation of the mortality from malignant neoplasms in this state during the last three years (the only ones for which we have anything like satisfactory records) leads to some quite unexpected results. In calculating the statistics, I have taken the deaths ascribed to "cancer" in comparison with the total mortality from all causes combined. Under this generic head it is probable that histological distinctions are not always accurately observed between sacoma and carcinoma, and there may be other errors of diagnosis; but, as all the cases reported have ended fatally, their "malignant" character may be assumed, and on the other hand, it is almost certain that many deaths from internal carcinoma escape detection and are imputed to other causes, so that, on the whole, the figures which I have tabulated rather understate than exaggerate the facts.

In the three years the deaths from all causes certified in the state at large amounted to 264,161. Of these, 6,262 were reported as due to "cancer"—1 in every 42:2, or a little more than 2⅓ per cent. A farther examination of the distribution by districts exhibits the curious circumstance that the relative mortality from "cancer" bears an inverse ratio to the density of population, being greatest in the sparsely settled rural regions.

For convenience of registration the state is divided into eight districts,—the Maritime, comprising New York, Long Island, Staten Island, and Westchester county; the Hudson Valley, embracing the counties on both sides of the river,

except Westchester, up to and inclusive of Albany and Rensselaer; the Adirondack and Northern, grouping Washington, Warren, Hamilton, Essex, Clinton, Franklin, St. Lawrence, Jefferson, and Lewis; the Mohawk Valley, taking in Schenectady, Schoharie, Saratoga, Montgomery, Fulton, Herkimer, and Oneida; the Southern Tier, including the seven counties along the southern border of the state; the East Central, composed of Sullivan, Delaware, Otsego, Madison, Chenango, Onondaga, and Cortland; the West Central, containing Cayuga, Tompkins, Seneca, Schuyler, Ontario, Yates, Livingston, Genesee, and Wyoming; the Lake Ontario and Western, consisting of Oswego, Wayne, Monroe, Orleans, Niagara, and Erie. Of these, the first, second, and eighth are the most thickly inhabited and hold by far the largest city populations, yet in them the "cancer" ratio is markedly lower than in the rest, as is shown in the table which I herewith submit:

MORTALITY FROM "CANCER" IN THE STATE OF NEW YORK.

Districts.	1885.			1886.			1887.			3 years.			
	Total deaths.	Cancer.	1 in:	Total deaths.	Cancer.	1 in:	Total deaths.	Cancer.	1 in:	Total deaths.	Cancer.	1 in:	
1. Maritime . .	55,021	1,027	53.6	57,420	1,171	49.0	61,715	1,317	46.9	174,156	3,515	49.5	2.02 per ct.
2. Hudson Valley	8,941	238	37.6	9,639	232	41.5	9,895	233	42.5	28,475	703	40.5	2.47 "
3. Adirondack and Northern. .	2,428	66	37.1	2,479	92	26.9	2,969	112	26.5	7,876	270	28.8	3.47 "
4. Mohawk Valley	3,174	99	32.1	3,559	115	30.9	4,359	165	26.4	11,092	379	29.2	3.42 "
5. Southern Tier	1,741	68	25.7	1,852	83	22.3	2,513	74	33.9	6,106	225	27.1	3.69 "
6. East Central .	2,444	89	27.5	2,947	110	26.8	3,465	107	32.4	8,856	306	28.9	3.46 "
7. West Central .	1,812	58	31.2	2,056	72	28.5	2,474	94	26.3	6,342	224	28.3	3.53 "
8. Lake Ontario and Western	4,745	177	26.9	7,448	204	36.5	9,065	259	35.0	21,258	640	33.2	3.01 "
Totals . . .	80,306	1,822	44.1	87,400	2,079	42.0	96,455	2,361	40.9	264,161	6,262	42.2	2.37 "

1. Includes New York, Long Island, Staten Island, and Westchester county.
2. " counties (except Westchester) on both shores of Hudson river, up to and inclusive of Albany and Rensselaer.
3. " Washington, Warren, Hamilton, Essex, Clinton, Franklin, St. Lawrence, Jefferson, and Lewis.
4. " Schenectady, Schoharie, Saratoga, Montgomery, Fulton, Herkimer, and Oneida.
5. " the seven counties along the southern border of the state.
6. " Sullivan, Delaware, Otsego, Madison, Chenango, Onondaga, and Cortland.
7. " Cayuga, Tompkins, Seneca, Schuyler, Ontario, Yates, Livingston, Genesee, and Wyoming.
8. " Oswego, Wayne, Monroe, Orleans, Niagara, and Erie.

Better to illustrate the correspondence, I have prepared a second table giving for each district the area, population, and the density to the square mile. For these data I am forced to rely on the census of 1880, forasmuch as a difference of opinion between the executive and legislative departments at Albany has prevented any later enumeration; but the increase of population since then has affected the three originally densest districts much more than others.

AREA, POPULATION, AND DENSITY.

District.	Counties.	Area in sq. miles.	Population (Census 1880.)	Density per square mile.
1 Maritime	New York.	20	1,206,577	
	Queens.	290	90,547	
	Kings.	70	599,549	
	Suffolk.	750	53,926	
	Richmond.	60	38,994	
	Westchester.	500	108,987	
		1,690	2,098,580	1,241
2 Hudson Valley	Albany.	490	155,044	
	Rensselaer.	650	115,340	
	Greene.	650	32,695	
	Columbia.	690	47,925	
	Ulster.	1,150	85,838	
	Duchess.	820	79,182	
	Orange.	800	88,217	
	Putnam.	240	15,181	
	Rockland.	200	27,690	
		5,690	647,112	114
3 Adirondack and Northern	Washington.	860	47,874	
	Warren.	940	25,180	
	Hamilton.	1,750	3,934	
	Essex.	1,650	34,515	
	Clinton.	1,000	50,901	
	Franklin.	1,760	32,389	
	St. Lawrence.	2,900	85,993	
	Jefferson.	1,140	66,106	
	Lewis.	1,300	31,416	
		13,300	408,308	31

District.	Counties.	Area in sq. miles.	Population (Census 1880.)	Density per square mile.
4 Mohawk Valley . .	Schenectady.	200	23,558	
	Schoharie.	650	32,938	
	Saratoga.	800	55,155	
	Montgomery.	400	38,315	
	Fulton.	540	31,006	
	Herkimer.	1,440	42,667	
	Oneida.	1,200	115,325	
		5,230	338,964	65
5 Southern Tier . . .	Chautauqua.	1,000	65,349	
	Cattaraugus.	1,350	55,806	
	Alleghany.	1,050	41,801	
	Steuben.	1,500	77,581	
	Chemung.	440	43,065	
	Tioga.	500	32,672	
	Broome.	690	49,481	
		6,530	365,755	56
6 East Central . . .	Sullivan.	900	32,490	
	Delaware.	1,550	42,719	
	Otsego.	950	51,397	
	Madison.	630	44,115	
	Chenango.	890	39,890	
	Onondaga.	820	117,885	
	Cortland.	480	25,824	
		6,220	354,320	57
7 West Central . . .	Cayuga.	760	65,084	
	Tompkins.	500	34,445	
	Seneca.	340	29,279	
	Schuyler.	400	18,842	
	Ontario.	680	49,377	
	Yates.	330	21,085	
	Livingston.	650	39,573	
	Genesee.	490	32,655	
	Wyoming.	600	30,907	
		4,750	321,247	68
8 Lake Ontario and Western	Oswego.	960	77,914	
	Wayne.	630	51,701	
	Monroe.	720	144,902	
	Orleans.	400	30,128	
	Niagara.	500	54,174	
	Erie.	1,000	219,886	
		4,210	578,705	137

Counting the massing of city populations alone, nearly the same proportions are obtained. These are as follows, according to present estimates:

Maritime District,	New York City,	1,526,081	
	Brooklyn,	757,755	
	Long Island City,	21,000	
	Yonkers,	26,000	
			2,330,836
Hudson Valley,	Albany,	98,000	
	Troy & Lansingburgh,	75,000	
	Hudson,	10,000	
	Kingston,	21,000	
	Poughkeepsie,	20,200	
	Newburgh,	20,000	
			244,200
Adirondack & Northern,	Ogdensburg,	11,000	
	Watertown,	12,200	
			23,200
Mohawk Valley,	Schenectady,	20,000	
	Amsterdam,	14,000	
	Utica,	43,000	
	Rome,	12,045	
			89,045
Southern Tier,	Binghamton,	30,000	
	Elmira,	25,000	
	Jamestown,	15,000	
			70,000
East Central,	Syracuse,	80,000	80,000
West Central,	Auburn,	26,000	26,000
Lake Ontario & Western,	Oswego,	24,000	
	Rochester,	110,000	
	Lockport,	15,000	
	Buffalo,	230,000	
			379,000

At the first glance one might be inclined to imagine that the preponderance of deaths from other causes in crowded populations would account for the relative apparent lessening of the "cancer" mortality, but the general death-rates are, taken collectively, higher in the more thinly inhabited districts. These rates, reckoned in proportion to the actual population from which reports are received, as nearly as they can be estimated in the still very incomplete condition of our state registration, were, for the three years in question,—

DEATH-RATE ANNUALLY PER 1,000 OF POPULATION REPORTING.

District.	1885	1886	1887	Average
1. Maritime, ...	24.5	25	25	24.8
2. Hudson Valley, . . .	33	24.5	28	28.5
3. Adirondack & Northern, .	31	29	37	32.3
4. Mohawk Valley, . .	22.3	27.5	30	26.6
5. Southern Tier, . . .	19	23.6	22.7	21.4
6. East Central, ...	23.9	16.7	28.7	23.1
7. West Central, . . .	26.5	26.8	31	28.1
8. Lake Ontario & Western, .	24.7	19.3	22.5	22.2

The fluctuations in a few of these records indicate that rural boards of health have failed to register all the deaths occurring within their jurisdiction, and this negligence is known to have existed chiefly in the more scattered populations, the registration in cities and in the larger villages being much more satisfactory, since in these, as a rule, there is rigorous enforcement of the law prohibiting burials without permits from the local health boards.

In our present ignorance of aetiology it seems futile to seek an explanation of the problem set forth in the statistics cited. They do not bear out Mr. Haviland's conclusions as to the geological distribution of cancer in Great Britain, since there is the widest diversity of geological and topographical conditions in districts with similar cancer rates. If we accept the hypothesis that the transformation of "benignant" into "malignant" new-growths is more frequent than is commonly supposed, the diminution of "cancer" mortality in and about large centres of population may possibly be ascribed to earlier surgical intervention. Certainly sarcomata, adenomata, and other neoplasms with a greater or less tendency to recurrence or to malignant alteration, come oftener and sooner under the scalpel in such circumstances.

As regards predisposition to malignant growths, it may be added that Dr. J. S. Billings, analysing the returns of the 10th U. S. census, finds the mortality from "cancer" per 100,000 of population to be 27.96 among the white, and but 12.17 among the colored, and also infers that the Irish and Germans are more subject to cancer than persons of other nationalities.

Dr. E. M. Moore, of Monroe county, said that the subject had been so admirably discussed in all its aspects as to leave him nothing to add beyond the rehearsal of some personal experience. The practical bearing of the question was in relation to the efficacy of surgical intervention. There would often be doubt about the diagnosis, but he was inclined to believe that the opinion of those accustomed to see cancer in its typical forms was as reliable as any microscopical examination. He could recollect the enthusiastic confidence with which the discoveries of the microscope were accepted thirty or thirty-five years ago, and how, despite the skepticism of some observers, it was supposed that a distinctive cancer cell had been found. This view had finally been abandoned; and even now there were difficulties attending the diagnostic employment of the microscope as regarded the precise recognition of embryonic cells and distorted epithelial cells. He had hoped that some one would announce the discovery of a "microbe" to account for the alteration of the cells in cancer, but feared that no specific germ was yet within our reach.

Touching the curability of malignant disease by operation, he recalled the celebrated case in the practice of Dr. Mussey, in the early part of this century. A man, aged thirty-five, had osteo-sarcoma of the hand, for which amputation of the forearm was performed. After a few months the disease reappeared in the stump, and a second amputation was made above the elbow; but again there was a recurrence, and in reluctant compliance with the patient's request, the shoulder joint was disarticulated. After awhile the disease showed itself in the scapula and clavicle, and only because of the earnest insistence of the patient, Dr. Mussey removed these bones, for the first time on this side of the Atlantic. No farther recurrence took place, and Dr. Moore had subsequently seen the man, who was then sixty years of age and in good health. In this case the malignity of the disease was shown by its recurrences, and the cure was beyond doubt. Dr. Moore had operated on a good many cancers of the breast, where the patients died late in life from other causes without any recurrence of the malignant process. He considered the age of the patient as of great importance in prognosis. The older the individual when first attacked, the greater the likelihood of a cure. There were two diseases in which the old had a better chance than the young: One was cancer, the other, diabetes. His attention was first called to this peculiarity of age in the case of a lady, seventy-nine years old, who consulted him about an axillary tumor, the size of a small orange, cancerous in its nature, but so clearly involving the blood-vessels that he was unwilling to remove it. Nine years previously an ulcerating tumor had been removed from the breast, and the wound had healed perfectly. Unfortunately an involved lymphatic gland had been left in the arm-pit, and this gland had after such a lapse of time reached the size which he had mentioned. Without operation, the patient lived to the age of eighty-

three, dying ultimately from ulceration of the tumor. In another instance, he removed from a woman, aged sixty-two, a scirrhous breast, including the axillary glands, and seventeen years afterward saw the patient, fat and hearty. A woman on whom he had operated sixteen years ago, when she was at the age of forty-five, was still living and in perfect health. Another, aged sixty, lived twelve years after the operation, and died of pneumonia. He could mention many other cases in which five, six, and seven years had elapsed after operation, and thought that these might be regarded as cures. On the other hand, a man had consulted him for a small cancer of the lip, recurring in the scar where a similar growth had been removed seventeen years before. He excised the diseased tissue freely, but it soon returned in a most exaggerated form. His observation of the frequent connection of cancer with an antecedent injury had convinced him of the local character of the disease long before this belief had become as general as at present.

The President, referring to Sir James Paget's views concerning the influence of heredity, cited a family history of cancer extending over four generations. The first he did not see, but the other three came under his own observation. The great-grandfather had died of cerebral tumor, which was pronounced malignant; the grandfather died of cancer, under Dr. Cronyn's care; in the third generation, of two brothers, one died of cancer of the neck, the other of cancer of the face, commencing with a small epitheliomatous wart on the side of the nose. This was removed, and after twelve years of immunity recurrence took place in the face. The son of this patient now has epithelioma of the face.

As illustrating metastasis, he adduced a case in which he had removed the entire lower lip for epithelioma, cutting below the chin, although the tumor involved only the centre of the lip. The patient remained in excellent health for six years, when he began to suffer from dyspeptic symptoms, and ultimately died of cancer of the pylorus.

Dr. C. B. Nancrede, of Philadelphia, adverted to a case in which the elder Gross operated repeatedly, removing, he thought, from thirteen to fifteen tumors, until finally they ceased to recur. The patient lived, he believed, many years afterward, dying ultimately of some other disease. With reference to the peculiar tendency of carcinoma to follow only the lymphatic route, a man about seventy years old came to his clinic to have a degenerated wart or mole removed from the lower part of the dorsal spine. On examination it proved to be an epithelioma, and both armpits were filled with secondary growths. The only route to that portion of the spine was through the axillary glands. In relation to the apparent recurrence in the scars of former operations, he adduced two instances where close examination showed new centres of disease to be situated very near, but not in, the line of earlier incision. In respect of heredity, Dr. Nancrede did not comprehend how a man could transmit to his off-

spring a disease which did not manifest itself until the age of sixty or seventy. Sir James Paget got over the difficulty by saying that it was transmitted potentially—whatever that might mean. In advanced life the connective-tissue barrier failed to exclude the epithelial elements. Prior to such failure, a neoplasm might spread outward and form a papilloma, but not an epithelioma. It had occurred to him many years ago that there was a senile change in one or other of the tissues, in accordance with which we might have benign or malignant growths. It was probably true that the prognosis was better in the old than in the young; but age was a relative term, and carcinoma of the breast unquestionably occurred in early life. He was cognisant of one case, proven by microscopic examination, in a woman under twenty-five. The relation of traumatism to carcinoma was an important point. In illustration of this he cited the case of a woman, aged thirty-three, both of whose parents had died of cancer, in whose breast the irritation of a broken corset steel had in a few days produced a small lump. When Dr. Nancrede saw her, the tumor was an inch and a half in diameter, and there was a secondary growth, larger than the primary one, in the axilla. She still remained well after the lapse of between eight and nine years. He thought that age was not always to be measured by years: the question was, whether the tissues were old or young.

The President stated that in the cases of which he had spoken the ages were respectively seventy, sixty, forty-five, and thirty years.

Dr. W. Q. Huggins, of Niagara county, spoke in relation to operations on persons of advanced age, and recited the case of an elderly lady whom he had been called to see more than fourteen years ago, suffering from severe asthmatic symptoms. Incidentally she showed him a tumor in her left breast, which he diagnosticated as cancerous, but, considering her age, he advised against an operation, thinking at the time that she would not live more than five or six years at the longest. Her health continued to be about the same for a long while, the tumor seeming to grow from time to time, and she died about six weeks ago, over fifteen years from the time when she had first noticed the tumor. Latterly, the cancer had given her considerable pain, and had discharged more or less pus, but it was not the immediate cause of her death, which was from general dropsy and other troubles. The case had been examined by many physicians, who all agreed in the diagnosis of cancer. He reported it on account of its long duration.

Dr. J. G. Truax, of New York county, mentioned two cases of carcinoma of the breast, verified by microscopic examination, on which he had operated in 1885. Both patients were still frequently seen by him, and in neither was there any recurrence. In a third instance he had amputated a carcinomatous breast a little more than a year ago, and thus far there was no sign of recurrence.

A Fellow thought that previous speakers had not sufficiently noted the distinction between cancers which had gone on to ulceration and breaking down, and those which were in the early stages. In 1880 he was consulted by a patient with a large tumor in her breast and enlarged glands in her axilla. His diagnosis of cancer was confirmed by Dr. Frank Hamilton, and he advised immediate removal. The patient declined an operation, and had recourse to a massage manipulator in Brooklyn, under whose treatment the tumor increased very rapidly. At the end of a year she returned to the speaker with an immense excavation. On account of the extent of the disease he discouraged the idea of operating, but she insisted so strongly that he removed the entire breast and subjacent tissues, exposing the ribs, and cleared the axilla of all glands. She recovered, and lived in better health than for many years before, until she died of acute lobar pneumonia, five years after the operation, no recurrence having taken place. In this case the ulceration had existed for three months prior to the operation.

Dr. Squire, of Chemung county, reported a case in his practice in which eight operations were performed. A woman, aged forty when she first consulted him, had noticed a tumor the size of a chestnut in her left breast in 1874. The first operation—removal of the breast—was done in 1880. Two years and four months afterward, a second operation was performed for the removal of an axillary gland which had shown no evidence of disease on the former occasion. Three months later, two large glands were removed from the same axilla; and two others were extirpated at the end of nine months. After a similar interval, another gland was excised; and two more from the same situation, three months later. Again, after five months, a large gland was ablated. The eighth and last operation, on the same armpit, was for the removal of a diseased gland and cicatrix. This was nearly three years and four months ago, and the woman is almost well.

Dr. Gouley, when called to defend his thesis and close the discussion, said,—

1. The object of the remarks introductory to the discussion on tumors was to elicit the opinions of the Fellows of the Association and others on questions of theoretical and practical value that have not been definitively settled, such as the questions of names and arrangement, of genesis, of metamorphosis, of contagiousness, of diagnosis, of treatment, of recurrence, and of cure. The time allotted to the discussion, being comparatively short, did not permit as complete an examination as the subject merits. It is therefore hoped that the Association will soon direct the reopening of a question of such vital importance as the examination of new formations in the human body, and particularly of the so-called cancerous tumors.

2. In the defence of the thesis presented to-day, and in the closure of this discussion, an endeavor will be made to invalidate the exceptions taken by the debaters against some of the views declared in the introductory remarks.

3. The question of consistent adherence to the anatomical basis for the nomenclature and classification of tumors received to-day only one negative answer; and this negative answer was not directed to its basis, but to the nomenclature itself, to the effect that the profession "would not stand the long names" given in the schema presented. The learned Fellow who made this assertion has, unintentionally, reflected upon the intelligence and scholarship of those most interested in the study of tumors, and it is more particularly for their use that the nomenclature is offered. But he has lost sight of the fact that the old names of tumors, placed between brackets in the schema, were given during the introductory remarks. There does not appear among these "long names" a single word which is not in current use in medical language, and to the histologist these "long names" are definitions of the pathic conditions which they are intended to designate. It may be said that the highest aim of the nomenclator is attained when he gives names which indicate the nature of the objects so named. Descriptive names are often considered good, but those that define are best. The debaters should remember that generic names mostly are used in ordinary medical language; that generic names are single—for instance, epithelioma for cancer, endothelioma for sarcoma; that single names for genera are in strict accordance with the rules of nomenclature and classification laid down by the highest authorities in nosonomy and nosotaxy; and that certain modern writers violate these rules by making use of the terms epithelial cancer for cancer and endothelial cancer for sarcoma, thus employing two words to express each generic name. The specific, varietal, and subvarietal names must of necessity consist of more than one word, that they may be distinguished one from another. The memory of the student of medicine is no more taxed by compound names than is the memory of the student of botany. The botanist is obliged to study his subject in accordance with the schema of which the following is a fair illustration, only one species, one variety, and one subvariety of clematis being given:

KINGDOM.—VEGETABLE.

SUBKINGDOM.—ANTHOPHYTA.

CLASS.—ANGEIOSPERMAE.

Subclass.—Dicotyledonae.

Order.—Ranunculaceae.

Genus.—Clematis.

Species.—Clematis alpina.

Variety.—Clematis alpina occidentalis.

Subvariety.—Clematis alpina occidentalis tenuiloba.

The student of botany does not complain of long names. He soon becomes familiar with these names, and conducts his investigations agreeably to a method which has been shown to be time and labor saving; and compound names are essential to this method. Why should not the medical man do likewise, since his time is as precious as, and his life no longer than, that of the botanist? The objection to the "long names" is not only ill-founded, but seems to carry with it the implication that the mental calibre of medical men is inferior to that of other men of science. No refutation of such an idea is needed. Aside from certain preliminary requirements, is not the study of medicine of itself conducive to exact methods, and is it not true that this study must begin with philosophy, which presupposes a knowledge of the value of correct terms? In point of fact, students of medicine are trained to remember compound names from the beginning of their anatomical work. They are required to remember the Latin names of all the bones, muscles, etc. They must soon become acquainted with *musculus sterno-cleido-mastoideus*, *musculus genio-hyoglossus*, *musculus levator-labii-superioris-alaeque-nasi*, etc. But they are unjustly asked to form a conception of what is the column of Goll, of what are Pott's, Graves's, Basedow's, and Duchenne's diseases, and of many normal and diseased structures also bearing the names of men! If they are able to remember all this, will it not be easier for them to memorise compound names that are well formed and based upon anatomy? In the case of species, varieties, and subvarieties of tumors, the points of difference are so marked in their gross anatomical and in their histogenic characters that the compound names given them are not only justifiable but essential.

4. The old saying that "the profession is not yet ripe for a philosophical nomenclature and classification of diseases" is still often reiterated by those who lose sight of the fact that nomenclature and classification, diligently studied, are the best exercises to ripen and broaden the medical mind, and that the endeavor properly to name and systematically to arrange morbid conditions leads to the most direct path toward the right understanding of their nature. Without some sort of nomenclature of diseases no medical book could ever have been written, and the earliest medical writings were most probably the outcome of a nomenclature begun long before, and of many attempts at arrangement. Medical writers, ever since the time of Hippocrates, made successive improvements in nomenclature, until Cesalpino, Platerus, Warenius, and others suggested systematic arrangement of the diseases already named, and until this was carried into effect by Sauvages. From that period many generations of physicians have contributed their share in the improvement of both nomenclature and classification; and it behooves every new generation to do likewise, for the work will probably never end. To attempt to make an entirely new arrangement would not be wise; to strive to improve that

which is at hand is practicable and practical; but to wait for farther maturity of the medical mind is virtually to retrograde. The time for improvement is always the present.

5. Some of the debaters, and not a few writers, have made use of the word "papilloma" as a generic term, most probably, however, through inadvertence, for they are well aware that there are no "papillomata," but that papillae are sometimes found upon the surface of certain benign as well as of malignant growths, and that these papillae upon neoplasmata can only constitute subvarieties—*e. g.*, papillary cylindro-cellular ino-epithelioma, papillary squamo-cellular epithelioma, papillary fuso-cellular endothelioma (sarcoma), papillary inoma, etc. The term "papilloma" has led to much confusion among clinicians, and the question of the benignity and malignity of "papillomata" was long under debate. Some clinicians believed "papilloma" to be benign, while others were of the contrary opinion. Those who regarded it as benign were right when the growth proved to be a papillary inoma, which is known to be benign, and the others who regarded it as malignant were right when the growth happened to be a papillary epithelioma or a papillary sarcoma, known to be malignant; but when on the one side it was asserted that all "papillomata" are benign, and on the other side that they are all malignant, both contesting parties were manifestly wrong. It is clear, then, that no tumor is entitled to the name papilloma, and that the prefixed adjective papillary is a subvarietal designation.

6. Telangiectasis in the malignant growths named in the schema can only constitute a subvariety—*e. g.*, telangiectatic polymorpho-cellular ino-epithelioma, telangiectatic cylindro-cellular ino-epithelioma, formerly called fungus haematodes, after the beginning of the necrotic process in the tumor. Inasmuch as this bleeding fungus occurs also in sarcomata and other tumors, it is clear that fungus haematodes cannot be regarded as a distinguishing character of any particular genus of new-growths. Is it not therefore better to employ names of several words which indicate the histogenic characters of tumors, than to perpetuate such a name as fungus haematodes, which can only convey an incomplete, if not erroneous, notion of the disease?

7. Many observers agree that, in epitheliomata, involvement of the lymphatic glands is very common, because cells are carried away from the primary growth chiefly through the lymph-current, while in endotheliomata (sarcomata) lymphatic glandular involvement is very uncommon because the disease generalizes itself chiefly through the blood-current. These facts, which have an important bearing in the differential diagnosis of epithelioma and endothelioma, were very properly set forth to-day by Dr. Carmalt, Dr. Nancrede, and Dr. Jacobson.

8. Endotheliomata (sarcomata) sometimes spring up from the neighboring tissues after fractures of long bones, preventing their union. Dr.

Jacobson's case is a good illustration of this complication of fracture. But endotheliomata and other malignant growths of the periosteum or of the osseous tissue have been known to be indirect causes of fracture of the long bones. The so called spontaneous fractures, occurring even when patients have attempted a sudden movement of the body in bed, are, in some instances, the outcome of malignant disease directly or indirectly affecting the bones.

9. Dr. Nancrede's point in reference to the place of the surgeon's attack in the ablation of certain breast cancers is sound and well taken,—viz., that "he should begin his operation in the axilla, and that in case it were not possible to remove all the diseased lymphatic glands, he should abandon the operation upon the breast." Therefore it may be said that whenever the lymphatic system is extensively invaded, the operation upon the primary neoplasma is contra-indicated.

10. After asking the question whether there are specific histogenic characters by which cancer may be distinguished from other tumors, Dr. Moore made reference to the "caudate cell," now almost forgotten. Before answering the doctor's question, a brief statement of the history of the "caudate cell" will be made for the benefit of the junior Fellows of this Association. During the development of the cell doctrine, histologists, in endeavoring to solve the problem of specificity of cancer cells, thought they had discovered in the "caudate cell"—an elongated cytoblast, with a tail-like appendage, a large nucleus, and well defined nucleolus—the typical cell of cancer; but this notion was soon overthrown by the discovery of such cells in the normal urine of man, and afterward among the epithelia of the urinary passages,—the epithelium of the bladder having been found to consist of many forms of cells, among which were "caudate cells."

In 1853, or perhaps before that time, the histologists had already arrived at the conclusion that there is no single typical cancer cell, but that certain cancerous tumors contain all forms of epithelial cells, while such is not the case in other tumors. This is only a part of the answer to Dr. Moore's question. Polymorphism of the cells is now admitted as a distinguishing character of certain cancers; but there is another element which is also an essential characteristic, and that is fibrous tissue forming alveoli in which the cells are contained; and fibrous tissue, being derived from the elements of the mesoblast, gives to these cancers, in this respect, a common origin with sarcomata. The derivation of such cancers is therefore triple, *i. e.*, epiblastic, hypoblastic, and mesoblastic, while other cancers issue from the elements of the epiblast only. Fibrous tissue is found in the variety of cylindro-cellular epithelioma whose cells are monomorphic; but there is no fibrous tissue in the squamo-cellular epitheliomata whose cells are also monomorphic. This is as far as Dr. Moore's question can now be answered. It is, however,

necessary to look beyond histogenesis to fully explain what it is that makes cancerous and certain other tumors malignant, or, rather, what is the nature of the toxic element of malignant tumors. Bio-chemists may in time be able to give a satisfying answer to this very interesting and important question.

11. One of the debaters takes the ground that some of the cases cited, in the introduction to the discussion, to illustrate long periods of immunity are in reality absolute cures, and that when the disease reappears it is by an entirly new invasion. At first sight this view seems plausible; but since he tacitly admits that it does not apply to all of the cited cases, why, then, should it apply to any of them? Case II and Case III are fair examples of immunity for periods of eight and sixteen years, respectively, and of final recurrence in the scar. Case V and Case VII are also recurrences in the scar, in twenty and thirty years respectively; and there could be no better example than Case IX to support the view of recurrence after short and long intervals of immunity, and therefore of only temporary cure. Case XI could scarcely be regarded as an entirely new invasion. It is only Case X that might possibly be considered as a new invasion, the disease having reappeared in forty years. Dr. Muzzie's case, cited by Dr. Moore, is a fair case of recurrence. Dr. S. D. Gross's case of breast sarcoma, cited by Dr. Nancrede, is another good example of true recurrence, the patient having undergone twenty-two operations in four years, and being alive and in good health ten years and nine months after the last operation. The view that, clinically considered, cancers are curable, and that technically they are incurable, still seems tenable, for no proof has been adduced to show that the operation and subsequent treatment have eradicated the morbific elements, and that these elements have not remained latent, any more than that the growth is the result of an entirely new invasion.

12. The question of hereditary predisposition to malignant tumors, raised by Dr. Cronyn, is one of the most difficult of the problems to be solved. Any attempt at such solution must involve very extensive examinations of family records of many generations, and on the largest scale. Broca, in his treatise on tumors, gives an illustration of such an examination of the records of one family of thirty-three individuals, during three generations, covering a period of sixty-eight years, sixteen persons in the three generations of this family having died of cancer. The investigation was facilitated by the preservation of accurate memoranda made by three succeeding physicians who were members of the afflicted family. This is probably the most complete record in existence, and its perusal will well repay the student of the question of hereditary predisposition to malignant tumors.

13. The question of micro-organisms infesting malignant neoplasmata has not been proposed in this discussion, because none of the Fellows

were prepared to take it into consideration. In a future discussion it may be asked, Are there micro-organisms which can be regarded as peculiar to malignant neoplasmata? In Germany it has been asserted that there exists a cancer bacillus, but the proof of its existence is, so far, unsatisfactory.

14. In the latter part of the last and in the beginning of this century, the aid of chemistry was invoked in the study of tumors; but the work, considering the time when performed, was necessarily incomplete. Chemical investigation should now be instituted, on a new basis, with the object of ascertaining if there be leucomaines or extractives that are peculiar to malignant neoplasmata, or if these neoplasmata develop toxic elements other than leucomaines, which can account in any degree for some of the symptoms manifested by patients in the later stages of malignant disease.

15. The contagiousness of malignant neoplasmata by grafting or otherwise, and many other important questions, yet remain to be discussed.

ADDRESS ON MEDICINE.

MEDICAL NEW YORK IN 1800.

By John Shrady, M. D., of New York County.

October 11, 1888.

The present century dawned upon this city when the nation was in gloom. Washington, not many days before, had rounded out his symmetrical career with a death which touched the popular heart. John Adams was in the presidential chair; society was in its formative stage; partisanship was bitter; and the memory of a great struggle was still green. The city was sulking over the loss of the seat of the general government, which travelled by way of Philadelphia, and at last, in December, 1800, found a haven in Washington. Why should there not have been turmoil? for, says an annalist, "The great lawyers of that day were statesmen, and the great statesmen were lawyers,—Clinton, Hamilton, Burr, Jay, Livingston, Duane: it was so almost in every case." Immigration had not yet begun with its sweeping tide; the English and Dutch stock, in spite of frequent intermarriages, had not yet become thoroughly amalgamated.[1] The epithet, Tory, with many, was the word of greatest reproach; Hessian was a grade lower in the vocabulary; while the Revolutionary patriots, some of whom were in the sere and yellow leaf, were growing to be the idols of the day. The populace had hardly yet lost its awe of rank, which was now obliged to be content with wearing the more humble mask of respectability. Yet men consented to be led, and accepted conclusions if they only had the glamour of a great name. They had gained

[1] The last sermon in Dutch was said to have been preached in 1803, and church controversies over the language of devotion invariably ended in favor of the English.

liberty, it is true, but it seemed a legacy as unwieldy as it was unexpected. An air of mystery surrounded the teacher of polysyllabic sciences; and medicine, the art nearest to the human heart, imbibed the temper of the times. The city, with its advantages for commerce, was beginning to show signs of its future greatness; it already had luxurious tastes, but willingly worked hard for what it deluded itself into believing were merely comforts; and, meanwhile, the nuclei of colossal fortunes were begun, with a marvellous foresight. Robert Lenox, John Jacob Astor, and John G. Coster worked not for naught, though they worked with patience and in silence. The Irish revolutionary struggle of 1798 brought many additions to the shores; and the Palatines, the first of the German immigrants, with memories of Marshal Turenne and their smoking villages, were beginning to pass into the second generation. The hardy Swiss also brought their thrift, their patience, and their sagacity. There was also a leaning affection toward the French, and a copying of their Jacobin clubs, which began in a movement that ended in making Jefferson the third president of the sixteen-state confederation. The knee-breeches, cocked hats, and silver buckles had begun to give way to the red waistcoat and French pantaloon, and the very children began to omit, not unwillingly, their ceremonious courtesies to strangers. Anarchy had virtually come; but it came to a safe race, with a Saxon strain and a Saxon sense of justice. There was a trembling, but no upheaval. All felt that it was the world's last grand experiment of personal liberty; that man was to be trusted only once more. The over-topping spirit of party, which forbade friendship, and which, as ever, resorted to slander, culminated at length with the disgrace of Burr and the death of Hamilton upon the field of honor. There was a shudder, a pause, and then the flame shot up again. To repeat, this was an age of controversy, of fierce politics, and of unyielding dogmatism, in which the leaders were intolerant, arrogant, and aggressive.

In medicine, the methods of Galen rather than of Hippoc-

rates prevailed, and there was more art than science. Theory ruled the day, and, worse than all, there were but few pioneers first to doubt, and then to investigate. Men like Mitchell and Hosack, seeking to be leaders in everything while adroitly concealing their occasional superficiality, won the admiration of gaping followers. They gave conclusions, not facts: consequently there were many corrupted streams of medical doctrine. Physicians as a body talked learnedly but confusedly of Stahl, Hoffman, Boerhaave, Von Heller, and Cullen. They prated about nature, rational soul, inert practice, plethora, and depraved humors, but bled invariably and without grudging. Venesection was the fashion of the day, its omission was a sin.

At that time there were no laboratories for chemical and physiological inquiry, no accessible collection of anatomical specimens, and certainly no medical library of importance.[1] Therapy rather than aetiology was the aim of all teaching, and it is fair to presume that blackboard formulas were rife. In those days Sangrado had his torments of conscience, but they were on the line of unfulfilled duty lest he had not taken sufficient blood or given enough warm water. As regards practice, the medical historiographer has not much to present. General laws based upon what were called general principles were given the burthen of responsibility, disease being regarded as an entity; and it is curious to know how opinion has retroceded to the doctrine of Boerhaave, that the acrimony of the fluids, as disturbing causes, required to be neutralised by chemical remedies. It was this which kept calomel in the pharmacopoeia; it is essentially this which has crowned its chemical cousin with later honors. Can we say that none were right because both sides of the shield were not seen? At all events there was the recognition of a certain power, although the form was unknown; there was vision, indeed, but it was "through a glass darkly."

A list of the physicians as found in the Directory of 1800

[1] The library of the New York hospital claimed a catalogue of 1,500 volumes, and many of these were, probably, valuable on the score of their antiquity only.

is herewith presented. Of some, nothing can and very likely ever will be known, while others stand out in bold relief.

Anderson, Anthony L., 461 Pearl st.
Apple, Conrad, surgeon, 9 Murray st.
Anthon, Geo., M. D., 11 Broad st.
Bach, Robt., 128 Pearl.
Bainbridge, Absalom, 36 Pine.
Ball, Isaac, physn. and man midwife, 40 Chambers.
Bartlett, Wm., physn. and druggist, 59 Catharine.
Bartlett, William, Bedlow st.
Bayley, Richd., health officer, 37 Greenwich st.
Birch, Joshua E. R., physn., 16 Beekman st.
Bouvier, Julian, physn., 291 Broadway.
Bradhurst, Sam'l, " 345 Washington.
Brower, Abrm., physn. and druggist, 181 Greenwich st.
Brown, Joseph, 107 Liberty.
Cazavan, T., French physn., 45 Chapel.
Charleton, John, " 34 Broadway.
Clark, 34 Pine st.
Clarke, James, M. D., 2 Vesey st.
Corner, Richd., physn., 36 Water st.
Coventry, J. H., " 99 Green.
Cowan, Barnet, " 5 Thames, h. Bowery.
Cowan, John Nevil, 61 John st.
Dalmas, C., physn. and apothecary, 2 Robinson.
Decarendeffez, Odo, physn. and chymist, Pump st.
Degray, Michael, physn and apothecary, 8 Catharine.
Dickson, William, " 360 Broadway.
Dubois, Elisha, " 13 Barclay st.
Faugeres, Lewis, physn. and druggist, 79 John.
Field, Josiah H., " " " 82 Water st.
Fleming, Samuel, " 60 Wall st.
Gamage, John, " 20 John st.
Hamersley, William, physn., 6 Cortland st.
Helyes, Jean M., " 10 Murray st.
Hicks, Benjn., " 62 Chambers st.
Hicks & Son, John " No. 1 Magazine.
Hitchcock, Daniel M., " 317 Pearl.
Hosack, Alexr., Junr. " Pine, cor. Nassau.
Hosack, David, " 65 Broadway.
Hunter, James, Indian Doctor, First st.
Irving Peter, physn. and druggist, 208 Broadway.
Jackson, James, M. D., 4 Water st.
Johnson, Ephraim, physn., Orange.
Jones, Gardiner, " 20 Dey st.
Kinslay, Apollos, " Corlaers Hook.
Kissam, Benjn., " 159 Broadway.
Kissam, Richard S., surgeon, 45 Partition.
Lawrence, James, M. D., Elizabeth near Bayard.
Lawrence, William, physn., 19 Cherry.
Lebaunier, " 70 Chambers.
Lester, Andrew, " 97 Chambers.

Lewis, S. I., physn., 42 Maiden Lane and 308 Greenwich.
Lord, Daniel, " 77 Water st.
Lord, Silas, " 70 Vesey st.
Lozier, Nicholas, " 161 Greenwich.
Luckfildt, G., " 265 Broadway.
Lyon, Matthias C., physn., 64 Cortlandt.
Martin, Joseph, physn., Upper Road.
McLean, Hugh, M. D., cor. Beekman and Nassau.
M'Intosh, William, physn. and druggist, 154 William
M'Kinery, man-midwife and dentist, 17 Chambers.
Miller, Edward, M. D., 116 Liberty st.
Mitchell, Samuel Latham, M. D., E. Rutger near Cherry.
Moore, Wm., M. D., 21 Nassau.
Morton, Andrew, physn., 5 Frankfort.
Nesbit, Samuel, Sr. " 452 Pearl.
Onderdonk, John, 57 John.
Peck, David, physn. and apothecary, 331 Water.
Platt, Epenetus, physn., 74 Harman.
Post, Jotham, Jr., M. D., 28 Dey st.
Post, Wright, surgeon, 27 Wall and 20 William.
Proudfit, Daniel, M. D., 2 Pine st.
Rice, Henry, M. D., 4 Frankfort.
Riddle, John, physn., 448 Pearl.
Rodgers, John R. B., M. D., 9 Nassau.
Romayne, Nicholas, " Corlaers Hook.
Roorbach, Barnet, " 65 Maiden Lane.
Seaman, Valentine, " 88 Beekman.
Snedeker, I., physn. and surgn., Barley cor. L. Ann.
Stevenson, John, physn., 171 Division.
Stringham, James S., " 460 Pearl st.
Tillary, James, " 86 Broadway.
Torbart, Samuel, M. D., 1 Harmon.
Tripp, Lott, physn., 304 Pearl.
Vanbeuren, Beekman M., physn., Bowery.
Vangelder, Abraham A., " L. Catharine.
Van Solingen, Henry M., " 29 Maiden Lane.
Walters, Daniel D., " 49 Cherry st.
Ward, Timothy, " 94 Reed st.
Watson, Abraham, " 63 Reed or 50 Chapel.
Wheeler, Samuel, " 388 Pearl.
Willet, Jesse, " Harrison.
Wilson, " 5 Frankfort.
Wilson, John, " 42 Rutger.
Zeiss, John W., " 127 Chatham.

When this City Directory of 1800 was printed, Daniel Drake, Benj. W. Dudley, and Valentine Mott were each fifteen years old; Benj. Rush, then fifty-five, was treasurer of the United States Mint in Philadelphia, enjoying as no other man the honors of physician, author, and statesman.

In England, Edward Jenner was fifty-one years old, and

beginning to forestall a little of his world-wide fame. John Hunter had been dead seven years, but had left a record of unflinching toil and a priceless legacy of facts. William Hunter, his brother, older by ten years, had preceded him to the grave ten years, and Marshall Hall was only ten years old. John Abernethy was in his thirty-sixth year, and Sir Astley Cooper was four years his junior. Of all these, the last two made the most indelible impress upon the surgical opinion of the English-speaking world.

In France, Alexis Boyer, not yet a baron of the empire, was about forty-three, the author of a four-volume work on anatomy, a professor of surgery, hospital lecturer, and medical journalist. Dominique Jean Larrey was only thirty-four, with honors in prospect as great as unsuspected; and, greatest of all, Xavier Bichat, the biologist, not yet thirty, and within only two years of the close of his brilliant career. Laennec was only nineteen, and, of course, had not yet begun to wield the stethoscope, the very instrument which warned him of his own fate.

In Germany, there was undoubtedly made a progress like unto that of other countries, but its records were inaccessible through the want of translations, and, beside, its school had not at all become dominant.

It may be premised that many of the following sketches have been projected into a period beyond the proper chronology; but this has been essential, in order that the times might be delineated as affected by the *dramatis personae*.

Anderson, Alexr., son of a Scotchman who published "The Constitutional Gazette," was born April 21, 1775, and died January 17, 1870. He lost all his family by the yellow-fever epidemic of 1798, which destroyed 2,036 persons. He was himself attacked by the disease, while in attendance upon the physician with whom he studied, and who had been prostrated by it. Both recovered, and Anderson made a voyage to the West Indies, to visit a paternal uncle after whom he was named, and who was "the king's botanist" at St. Vin-

cent. On his return, he no longer fought against his youthful, nay, childish, tastes, and became the pioneer wood engraver of America. A medical graduate of Columbia college in 1796, his thesis was on "Chronic Mania." His name does not appear in the Directory, although probably in the city or in the vicinity at this date, or soon after. Perhaps, also, he may have already sailed for the West Indies. A diary of his, comprising his daily doings during the years 1795–'98, is still preserved.

ANDERSON, ANTHONY L., of Scottish birth or lineage, now aged about thirty years, was entering upon his industrious career. He subsequently became exceedingly popular as an obstetrician, gradually rescuing that branch of the medical art from the midwives, with whom the city abounded. He was not much of an attendant upon the societies, but was called very frequently as a consultant during the latter part of his life, even while a victim of some form of paralysis. He was a man of conservative views, believed very little in the power of drugs, and advocated "good air and good food, as being God's tonics."

ANTHON, GEO. C., was the father of Charles, the famous Greek and Latin professor of Columbia, John, a leading lawyer, and Henry, the eloquent and genial rector of St. Mark's —now all dead. He was a German, of the Duchy of Saxe-Meiningen, and his wife was a French Canadian. He was born in August, 1734, was graduated in medicine at Amsterdam, served the Dutch West India Company, sailed for Surinam in South America, was captured by a privateer, was appointed by Lord Amherst garrison surgeon at New York, was transferred to Detroit where he rose to be a surgeon-general, was captured by the Indians, conveyed down the Mississippi, and was afterward heard of at Pittsburgh. At the end of the Revolutionary war he came, in 1784, to New York, where he died in December, 1815. He was an esteemed authority on yellow-fever, and, although possessed of

ability, allowed his name to pass down to posterity as a mere tradition.

BARD, SAMUEL, was the son of Dr. John Bard, who died March 30, 1799. "He was," observes Dr. Valentine Mott, in a compensatory kind of way, "small in stature and hard-featured, but exemplary as a man and a Christian." He began practice in 1766, had a large experience, and in his day was considered the soundest physician in the city. He obtained his degree in Edinburgh, and attended Washington, as also did his father. In manners he was austere, but as dignified as a Commencement president. His titular history was, —Edinburgh, M. D., 1765; Coll. of N. J., LL.D., 1815; Prof. of Theory and Practice of Physic in Col. College; physician to New York hospital. He was known to attend cases in the city, although the name of neither father nor son appeared in the Directory after 1797, at which time their common residence was 98 William street.

BAYLEY, RICHARD, in 1781 published his letters addressed to Dr. William Hunter on "Angina Trachealis," and subsequently a history of "The Yellow-Fever at New York in 1795." He attempted, in this latter treatise, to draw distinctions between the terms *contagion* and *infection*. Dr. Bayley had a fine anatomical collection in the New York hospital, which was heaped into carts and burned to ashes in the Doctors' Riot of 1788. He married a sister of Dr. Charleton; was prominent and public-spirited. He died in August, 1801, while health officer of the port of New York, with a reputation as authority on matters of quarantine. Judging from a portrait in the possession of the New York Historical Society, he was a man of singular beauty of countenance.

BRADHURST, SAMUEL, was subsequently one of the trustees of the College of Physicians and Surgeons.

CHARLETON, JOHN, who enjoys the unique honor of having been the first physician in the city who used a gig, is

described as an Englishman, once in the British service, and as having been much at the court of George the Third. He was short in stature, with a florid face, of somewhat pompous manners, and fond of horseback exercise. He says of himself that he practised physic here since 1762, that he resided on Long Island five years of the war, and returned to the city in 1781. He had a fashionable practice, and is credited with having died possessed of considerable means. He married Mary De Peyster, daughter of Treasurer Abraham and Margaret Van Cortlandt De Peyster.

De Gray, Michael, was of Irish birth, and, according to tradition, had a son, also a physician, who died young. The father, who was a small man, tried his fortune in the West, but returned to the city disgusted.

Hicks, John, was on duty in the General hospital as one of the "Established Mates" during the British occupation of the city, as late as 1783. His war superior was John Mervin Nooth, superintendent-general.

Hamersley, William, "a graduate of Edinburgh, a man of talent, a logical and eloquent expounder of the theories of the day, but irascible in temper, eccentric in his habits and manner of teaching, and an indifferent practitioner. He was an honest man."[1]

Hosack, David, was born in the city of New York, August 31, 1769. His father, a Scotchman, came to America with Lord Jeffrey Amherst, upon the siege of Louisburg. His mother was the daughter of Francis Arden, of New York. He was educated at Columbia college and at Princeton; received his medical degree at Philadelphia in 1791; visited the schools of Edinburgh and London, where he wrote a paper on "Vision," which was published in the Transactions of the Royal Society in 1794; and on his return to New York filled the professorship of botany and materia medica in Co-

[1] Dr. Valentine Mott.

lumbia college. In the new College of Physicians and Surgeons he taught physic and clinical medicine, and was engaged in the short-lived Rutgers Medical College. He was eminent as a clinical instructor. He engaged with Dr. John W. Francis in the publication of the "Medical and Philosophical Register." His "Medical Essays" were published in three octavo volumes, 1824–'30. His "System of Practical Nosology" was published in 1829, and in an improved form in 1831. He wrote discourses on horticulture, on temperance, biographical notices of Rush and Wistar, and a memoir in quarto of De Witt Clinton. The style of these productions is elegant, but there is a reminder of the click of the swinging pendulum. Samuel Johnson, for him at least, had not lived in vain; there were present in his literary efforts the same artistic antitheses and the same rounded periods. To Hosack there was no English but that of Johnson.

From 1820 to 1828 he was president of the New York Historical Society. A posthumous publication on "The Practice of Physic," edited by Dr. H. W. Ducachet, one of his pupils, appeared in 1838. He was a man of imposing presence, with piercing black eyes, a sonorous voice, and dignified manners. He read his lectures, and insisted upon the strictest discipline in the class-room.

"Hosack was for more than thirty years a prominent medical practitioner in New York, and, fond of society, exercised a strong personal influence in the city. The Duke of Saxe-Weimar, in his travels in America, in 1825, mentions the social importance of his Saturday evening parties, where the professional gentlemen of the city and distinguished foreigners were liberally entertained. In all prominent movements connected with the arts, the drama, medical and other local institutions, and the state policy of internal improvements, Hosack bore a part.

"He was twice married,—in the first instance to a sister of Thomas Eddy, the benevolent Quaker at the head of the hospitals and charitable institutions of the city. By his second

wife, the widow of Henry A. Coster, he became possessed of a large income.

"Dr. Hosack died of an attack of apoplexy, at his residence in Chambers street, New York, December 23, 1835."[1]

IRVING, PETER, was an older brother of Washington Irving, who subsequently edited the "Morning Chronicle," which supported Jefferson and, particularly, Burr. He was born in 1771, and died in 1838, and at this time was, accordingly, only twenty-nine years old. He never paid much attention to practice.

KISSAM, BENJAMIN, a graduate of Edinburgh, was the son of Benjamin (the lawyer) and Catharine (Rutgers) Kissam. He was professor of the "Institutes of Medicine" in Columbia college from 1785 to 1792, trustee of the college, vestryman of Trinity church, etc.

KISSAM, RICHARD S., a younger brother of the above, was also educated at Edinburgh. The Kissams were nephews of Samuel Kissam, who received the first medical degree given in America.

MILLER, EDWARD. Dr. Valentine Mott, in speaking of him, says that he was a voluminous writer, and "on the subject of yellow-fever was an eminent authority. He strongly supported the theory of non-contagion, in direct opposition to Dr. Hosack." He was of middle stature, very handsome, wore powder, and was singularly neat in his attire; a bachelor—in manner peculiarly mild and bland. He died, March 17, 1812, of some acute affection of the chest, leaving an enviable and enduring reputation. He was at this time about forty years old.

MITCHELL, SAMUEL LATHAM, now thirty-six years old, described in a biographical sketch as "a man of great versatility, a charming companion, and an accomplished man of

[1] Chiefly from the memoir, by Dr. J. W. Francis, in Williams's "American Medical Biography," as quoted by the Cyclopaedia of American Literature, Vol. 1, p. 574.

the world. As a publicist and a devotee of science, he was unrivalled among the New York men of the day."[1] He wrote floridly, quoted Latin, the language in which his thesis was written, and made frequent classical allusions. The poet Drake said of him,—

> "It matters not how high or low it is,
> Thou knowest each hill and vale of knowledge."

And, again, Halleck, that smoothest of all our satirists, wrote in his bubbling way,—

> "Time was when Dr. Mitchell's word was law,—
> When monkeys, monsters, whales, and Esquimaux
> Asked but a letter from his ready hand,
> To be the theme and wonder of the land."

"He was a polished orator, versifier, and poet, a man of infinite humor and excellent fancy."[2] As a Columbia college professor, he published the system of Lavoisier, and was irreverently dubbed "Plogobombus" by the wits of the day. At the date of the Directory before us he was scarcely to be regarded as a member of the profession, as during the year he was elected a representative in the 7th congress of the United States, was wealthy by marriage, and far above the drudgeries of practice. He was probably a universal specialist, plus a little smattering of practical medicine, which he may have displayed with the pomp of a drum-major.

Rodgers, J. R. B., the father of Dr. J. Kearney Rodgers, was in person small, graceful, had a face of extreme interest, and was of very accomplished manners. He was a graduate of Edinburgh, a practitioner of eminence, and particularly skilled in his own department (obstetrics).

McLean, Hugh, was born about 1777, and therefore just about entering upon the duties of his profession. He died

[1] History of the New York Academy of Sciences. Fairchild. Published by the author. Art Age Press, New York. 1887.

[2] "Magazine of American History," for September, 1886. Article on "The New York Historical Society."

August 13, 1846, with the reputation of a long and faithful service in the city dispensary.

MOORE, WILLIAM, received his medical degree from the Edinburgh Royal College of Physicians in 1780, and was somewhere about forty-five years of age at the date of the Directory. He was an honorary member of the Royal Society of Physicians of Edinburgh, and at one time filled the presidential chair of the New York County Medical Society. He died in April, 1824.

NESBIT, SAMUEL, SR., "a native of Great Britain, and assistant surgeon in His Britannic Majesty's service in the years 1764 to 1769." At least, so reads his autographic record in the minute book of the Medical Society of the County of New York. He was at this time in his fifty-fourth year.

ONDERDONK, JOHN, on the authority of a monumental inscription, was "born August 22, 1768, and died August 23, 1832." He was accordingly in the thirty-second year of his age. He seems to have been quite active in medical society matters.

POST, WRIGHT, the son of a prosperous butcher, was tall, handsome, and of fashionable exterior, wore long whiskers, kept his hair powdered, turned back, and tied in a queue. "Those who recollect his thin, worn figure in his later years, wrapped in a furred surtout," continues Dr. Valentine Mott, in his Reminiscences, "could scarcely have recognised in him the elegant gentleman of the early days." Dr. Post had at this time attained to the very highest rank in his profession, both as physician and surgeon, and although equalled in the extent and renown of his surgical practice by his distinguished colleague in the New York hospital, Dr. R. S. Kissam, he stood, perhaps, alone in its lucrative practice, and in the confidence of the higher walks of society. He was unrivalled as an anatomist, a most admirable dissector, and one of the most luminous and perspicuous teachers ever listened

to, either at home or abroad. His manners were grave and dignified; he seldom smiled, and never trifled with the serious and responsible duties in which he was engaged, and which no man ever more solemnly respected. His delivery was precise, slow, and clear, and peculiarly adapted to the advancement of the junior portion of the class. He was one of the first American pupils (preceding Dr. Physick) of the celebrated John Hunter, of London, from whose lips, and those of Mr. Shelton, he imbibed those principles of practice which he afterward so ably and usefully applied. As an operator, he was careful, slow, elegant, and equal to any emergency.

Two great achievements are upon record to attest his powers. He was the first in this country to tie successfully, on the Hunterian principles, the femoral artery for popliteal aneurysm. The other was a case of ligature of the subclavian artery above the clavicle, without the scaleni muscles, for an aneurysm of the brachial, involving the axilla. The patient came from New Haven, in company with his physician, Dr. Gilbert. The aneurysm was cracked and oozing, and supported by layers of adhesive plaster. This operation never had been performed in this country before, and but once in Europe, and then unsuccessfully, by its first projector, Mr. Ramsden, of St. Bartholomew's hospital, London. In this operation the American needle for the ligature of deep seated arteries was first used in this city.

Dr. Post was equally eminent as a physician, and, for strict punctuality and courtesy toward his juniors, and a scrupulous regard for truth, was never exceeded. After a career of forty years as a Professor of Anatomy, he retired into private professional life, in which he continued active, with occasional intervals of ill-health, until his death, in the sixty-fourth year of his age.[1]

Prince, Benjamin, was a member, after this period, of the Medical Society of the County of New York.

[1] Condensed from sketch by Dr. Valentine Mott.

Proudfit, Daniel, was an Edinburgh graduate.

Roberts, Owen,[1] a Welshman who settled in New York in 1798. He practised medicine until he died, in 1817, leaving a wife, four boys, and a little property. The youngest son was the well known Marshall Owen Roberts, born in Oliver street, March 22, 1814.

Romayne, Nicholas, "a man of much eloquence and talent, wealthy, and indifferent to the active duties of his profession," says Dr. Valentine Mott, "but eager for its advancement and that of the interests of medical science. In person he was tall and handsome, but extremely fleshy. He lectured extemporaneously, with fluency and effect." He had a clannish regard for those of Holland descent, and spoke the language of his ancestors with no little purity of idiom, and still greater pride. He had at least a leading share in the organisation of the College of Physicians and Surgeons, of the Medical Society of the State of New York, and of the Medical Society of the County of New York. He was the first president of the three bodies. His thesis at his graduation in Edinburgh, "De Puris Generatione," with dedications in Latin to distinguished physicians and laymen, has come down to our day, a monument of the learning of those who received their medical degrees from that renowned university.

Seaman, Valentine, was a member of the Society of Friends, and the first regularly educated man of that community in New York. With Dr. Edward Miller he engaged in clinical instruction in the New York hospital in 1801, Dr. Seaman taking the surgical and Dr. Miller the medical side. This was the first attempt made to give clinical surgical instruction. He introduced vaccination, not without violent opposition.

Stringham, James S., a native of New York, obtained his degree from Edinburgh in 1799, Black, of Edinburgh,

[1] Name not in the 1800 Directory.

being his preceptor. "He was," says Dr. J. W. Francis, "the first teacher of Medical Jurisprudence in this country. He was distinguished for his admirable course of instruction, which, though embraced in some twelve lectures, imparted with great clearness the leading doctrines in forensic medicine."

Tillary, James, a Scotchman, educated in Edinburgh, physician of the St. Andrew's Society, which still exists, and member of the Royal Medical and Physical Society of Edinburgh, died here about 1815. As a commentary on the proportions of the mail service and the doctor's political importance, it may be stated that the post-office once occupied his residence on the corner of Broadway and Wall street, it having been removed there during the yellow-fever epidemic of a few years previous.

Van Beuren, Beekman M., was the son of Abraham Van Beuren, a former physician to the almshouse, to which office he himself succeeded. Beekman's grandfather, John, emigrated to New York about the year 1700, from Beuren, near Amsterdam. This John was a graduate of Leyden. Dr. Wm. H. Van Buren, the son-in-law of Dr. Valentine Mott, was a descendant of this family.

Van Solingen, Henry M., was a graduate of Queen's college, Medical department, in 1792. He was probably a descendant of Johannes Van Solingen, who settled in the city in 1728.

Walters, Daniel D., kept a drug store at 210 Chatham street, corner of Doyers, which was the ancestor of the almost historical house of Adamson & Olliffe, of No. 6 Bowery, the only store, according to old-timers, where "pure drugs" could be obtained. This Dr. Walters seems not to have obtained his medical degree until 1804, his Alma Mater being Columbia college.

WHEELER, SAMUEL, probably came from the East, as the minutes of the Medical Society of the County of New York make him a member of the Medical Society of Vermont.

WATKINS, SAMUEL, was an alumnus of Queen's college, Medical department, class of 1793, and therefore yet young in practice.

ZEISS, JOHN WILLIAM, late of the Military hospital of Hesse Cassel, came over with the Hessian troops; was a small man, exceedingly myopic, who lived to an old age in the enjoyment of a great reputation among the German portion of the population. He came here a widower, with two daughters, married again more than once, and lived in 1800 at 127 Chatham street, probably as the proprietor of a drug-store, which tradition credits him with having kept during a portion of his life. He must have been in esteem with his fellow-practitioners, as he joined the medical society of the county in 1806, and was a trustee of the College of Physicians and Surgeons, New York, from 1808 to 1811.

By an inspection of the list just given, it will be found that Amsterdam capitulated to Edinburgh, and that as a consequence the almost psychical theories of the Dutch had yielded to the anatomical facts of the Scotch. An intensely practical age hailed the change. Not all who practised were qualified by competent authority, although a few not thus empowered imparted some little eclat to their calling, even maintaining a degree of respectability in the face of its patrician leaders. Some of these men worked in silence, with modesty, and in the spirit of self-abasement; they contributed to the general fund of knowledge, but not in a permanent way. They may have been better practitioners than those who sought an outlet for their ambitions in side issues. These, in fact, may have made up the army, which made, in turn, the generals. Perhaps, too, to use a commercial simile, their names do not appear upon the ledger, since they were really out of debt to their generation. If the mode of treat-

ing disease was somewhat heroic, as in the case of yellow-fever, which was fought with cathartics, emetics, and with Peruvian bark for the remissions, there comes the extenuation that much stress was laid upon sthenic forms of disease, and that these routine measures were the only trustworthy methods of elimination. Their diagnoses, based, as they were, upon rational rather than upon physical grounds, were in many instances marvels of correctness. Upon this last fact the late Dr. Alonzo Clark was wont to comment with the most pronounced emphasis.

From the following compact passed at a meeting of the Medical Society of the State of New York, held in the city hall ye 13th day of January, 1801, an idea may be had of the charges at that period:

We, the subscribers, practitioners of physic and surgery in the city of New York, do agree upon the following rates of charges, for our professional services, from and after the first day of July, 1798, agreeably to which rates we do recommend our bills to be presented every six months, or oftener, if circumstances permit:

	Dol.	Cts.
Verbal advice	5	00
A letter of advice	10	00
An ordinary visit	1	00
A visit, with a single dose of medicine	1	25
Medicine to be priced as follows:		
For powders, each		12
Pills, each dose		12
Boluses, each		25
Electuaries, per ounce		50
Mixtures, per ounce		12
Decoctions, one dollar & $\frac{50}{100}$ per lb., or, per ounce		12
Infusion, one dollar & $\frac{50}{100}$ per lb., or, per ounce		12
Lotions, per lb.	1	25
Tinctures, per ounce		25
Vol. spirit, per ounce		50
Ointments and cerates, per ounce		25
Blistering plasters, according to their sizes, from 1 Dol. $\frac{25}{100}$ to	2	00
Other plasters, $\frac{50}{100}$ to	2	50
For a single dose of medicine, dispensed without a visit		62

Consultations.

The first visit in consultation	5 00
Each subsequent visit in consultation	2 00
A night visit	5 00
Visit at a distance from town, per mile	1 00
A visit to Brooklyn	3 00
A visit to Pawles' Hook	5 00
A visit to Staten Island	10 00
The last two charges to be doubled in Winter, or in stormy and tempestuous weather.	
The first visit in epidemic fevers, or in other diseases where there is personal danger incurred	5 00
Each subsequent visit under these circumstances	2 00

The Charges.

For curing a simple or virulent gonorrhea, from Ten to	20 00
For curing confirmed syphilis, from $25 to	100 00
For dressing a blister, from $\frac{50}{100}$ to	1 00
For dressing wounds, from one to	2 00
For applying cupping-glasses	4 00
For bleeding in the arm	1 00
For bleeding in the foot	2 00
" " jugular vein	2 00
For opening an artery	5 00
For inoculating and attending in the small-pox, from $5.00 to	10 00
Scarifications of the eye	5 00
Punctures in oedematous swelling	2 00
Inserting an issue	2 00
Inserting a seton	5 00
Introducing a catheter the first time	5 00
Introducing a catheter, each subsequent time	2 00
Extracting a calculus from the urethra	10 00
Reducing a simple fracture, from ten dollars to	20 00
Reducing a compound fracture	30 00
Setting dislocations, from $5.00 to	20 00
For reducing a prolapsus ani	5 00
For reducing a hernia	25 00
For opening an abscess, from $1.00 to	5 00
For amputating the breast	50 00
" " arm or leg	50 00
" " joint	100 00

For amputating the finger	10 00
" " penis	20 00
For extirpating the eye	100 00
" " tonsil	25 00
" " testicle	50 00
" " a polypus	25 00
" " a tumor, from $10 to	50 00
Perforating the rectum, nostrils, or the urethra	10 00
Paracentesis of the abdomen	10 00
" " thorax	50 00
Operation for an aneurysm	100 00
" " the hare lip	25 00
" " hydrocele	25 00
" " hernia	125 00
" " fistula in ano	50 00
" " fistula in perinaeo	25 00
" " phymosis	10 00
" " paraphymosis	10 00
" " fistula lachrymalis	25 00
" " wry neck	25 00
" " cataract	125 00
The operation of lithotomy	125 00
" " of bronchotomy	25 00
" " of trepanning	100 00
" " of circumcision	10 00

Midwifery Charges.

For a common case, from $15.00 to	25 00
For tedious or difficult cases, from $25.00 to	40 00

The fees, according to the accompanying bill, were moderate, and differed but little from the present day, now that the cost of living is very much higher. The probability is, that the physicians of the time carried with them their own medicines, and that the apothecaries in possession of a medical degree, license, or what not, got but very little of their patronage. Some of the latter class were familiar to the eye in the newspaper advertisements, as, for instance, "James Church, M. D., formerly pupil to Dr. Dennison, London hospital, announces a third edition of a brief dissertation on the Venereal Disease,"—from which we may infer that syphilis

was known even in the pastoral days of our city, even before its fall! Said Dr. Church announces his removal from his late residence, upper end of Broadway, to 157 Front street, near the Fly market. Here the transient trade was probably much better, and not so much confined to people other than seafaring men. Dr. Church was also proprietor of a patent Scotch ointment, which cures the itch in twenty-four hours, and had cured half a million of persons in Europe and America. Price, seventy-five cents. But whether the Duke of Argyle was a myth, or so good a man could have enemies, he is boldly styled an "illiterate quack" by a rival advertiser, who "sells genuine articles and not imitations, but valuable medicines of eminent men who have discovered them by a series of long practice and experience."

Dr. Angelis, from Italy, is another advertiser. He "prevents and cures Yellow-Fever by his Four Herbed Pills, prepared by himself" "He also cures the Venereal Disease, without the use of mercury, in a particular way, as used in Italy." But these men must have published their cases, or had distinguished patients, as Dr. Cowan, 5 Thames street, near the new building of the City tavern, Broadway, N. Y., also cures venereal complaints. He proclaims that "Secrecy and honor may be depended upon on moderate terms."

Dr. James McKinzey, of 37 Warren street, began as a dentist, and subsequently announced himself as a "man-midwife and dentist from Dublin."

Greenwood, Washington's dentist, and in possession of his certificate to that effect, dated within only a few months of his death, seems also to have allowed his accomplishments to have leaked out in the public prints and on the fly-leaf of the Directory. "The approbation which the late illustrious Washington was pleased to bestow upon him is a sufficient recommendation of his ability," says our undisguised egotist.

On the brighter side, however, may be noticed the "Society for the Relief of Distressed Prisoners," in which Drs. John Charleton, David Hosack, and John R. B. Rodgers were active. Perhaps, too, may be reproduced the fact that the

trustees of the City Dispensary made the following statement for the year 1799:

Received under their care	. .	517 patients.
Of which have been cured	. .	460
Relieved	. . . . .	10
Died	. . . . . .	16
Removed to City hospital	. .	10
Marine hospital	.	2
Bellevue hospital	.	5
Almshouse	. .	4
Remain under care	. . .	10

$1,148.66 was expended in medicines, salaries, etc.

This dispensary kept in good order four sets of apparatus for resuscitating those apparently drowned, with public notice where they were deposited.

Let us farther study the picture of the times. The city proper, with a stated population of 60,489, was bounded on Broadway by Anthony street, on the North river by Harrison street, and on the East river by Rutgers street. Even within these limits the houses were scattering, and surrounded by large gardens as well as vacant lots. Looking north, the town was an irregular quadrilateral, which followed the usual law of settlements, that of growing from the shores inward. The streets were dimly lit by oil; porters carried ladies across the muddy streets; and by nine o'clock the whole city, with the exception of the pleasure-seekers, was snoring between the upper and nether feather beds of the period. Wood was the universal fuel, chimney-sweeps were in vogue, and the milkman carried his commodity around in two cans, which were balanced from his shoulders upon a wooden yoke. Bootblacks called upon their customers early in the morning, and might be seen flitting along the streets with boots strung upon a long pole, as they came or went patron-bound.

The churches were illuminated by tallow candles in sockets along the walls. The minister had a brass candle-stick upon

each side of the pulpit, and a small tray with a pair of snuffers. The wealthy churches used spermaceti. "The singing was unquestionably praise," says a witty chronicler; "it certainly was not music." Pine knots not unfrequently displaced the tallow candles, even in the houses of the well to do.

There were no sidewalks in 1790;—at the date of the period concerning which this paper is written they had crawled in a kind of intermittent way as high as Murray street; subsequently the pavements were uniformly of brick, set cater-cornered. Every man swept in front of his own premises, and a common carrier took the dirt away.

The Bridewell, workhouse, and gaol were in the north part of the park, the almshouse had not yet been projected, nor the stones cut for the present city hall. A whipping-post was close at hand for minor offenders.

Carriages set high on springs which curved far backward were not altogether unknown, but ox-carts were the chief means of travel. A horse-chair, somewhat like the present sulky, but much more elaborately ornamental, was the vehicle of the ostentatious, and on long journeys a horse generally carried man and wife, the latter on a pillion behind.

There were ships with primitive appointments which sailed to London, sloops to Baltimore and other points upon the coast, and mail coaches, by the aid in part of indifferent ferries, were run to Philadelphia. The only theatre of consequence presented translated plays from Augustus Von Katzebue, who probably was the Rider Haggard of the day. From advertisements in the newspapers, it may be judged that slavery was not yet extinct, as for instance, "For Sale—A Negro boy about 14 years old; belongs to a single person, who has no manner of use for him."

Rooms were small in general and low always, that they might be heated with economy,—for there had been many hard winters, when hickory, oak, and chestnut had been as high as ten or twelve dollars a cord, and once, at least, the City Hall park had been despoiled of its wooden palings by

the poor. Only one room of the house was warmed, and its floor was carefully sanded; the others, cold, damp, and cheerless, were kept aglow with the gratitude of the occasional guest or the piety of the storm-staid minister. Samplers adorned the walls, but disappeared when it became politic to hide dates.

Pumps and wells were in the middle of the streets, and, except that delivered by the famous Tea Water Pump in Chatham street, the water was brackish and bad-odored. The water of this pump always found ready buyers from the licensed hawkers of the streets. Aaron Burr manoeuvred for an aqueduct company, to distribute the water pumped from wells through hollow logs, but did not quite succeed—he got only a bank: the water-works in Reade street were an after creation. There were ward overseers of pumps and wells, an office which was never abolished unless very recently, so that during the days of the Tweed regime, many a politician profited handsomely by the oversight. As a provision against fires, leather buckets with the addresses of owners were kept in their houses for conveying water to the rude hand-brake engines. Volunteers formed ranks, and passed these buckets from hand to hand along the line.

Quails and rabbits were shot on the old Potter's Field, afterward Washington square, and the whole intervening district was distinctly visible from a point of view near the state prison in Greenwich village.

The cupola of the New York hospital, just off Broadway, commanded an extensive view of the city, the two rivers, the bay, Staten Island, Long Island, and the Jersey shore. Hogs roamed the streets, wallowed in the green-scummed ponds, and besmirched the bag-shaped gowns of women. A rope-walk, extending from the Fresh Water pond, with its squalid surroundings, added nothing to the attractiveness of the sight, nor Potter's hill, just a little north of Chambers street.

On the east side of Broad street, some two hundred feet from Wall, stood the old Government House, built during the autocratic reign of Governor Peter Stuyvesant. This

house was of stone, cottage style, with gable-end streetward. Another was the old Federal hall, on the north-east corner of Wall and Nassau streets. Its front stood on pillars, on the kerb line, and projected over the sidewalk, which was clear for pedestrians.

Brooklyn had but few houses, limitless fields, and the usual powder-house in its most remote part. One two-horse stage-coach ran between Paulus Hook and Newark: left the latter place in the morning after bustling around two hours or so for passengers all over town, and returned to its starting-place in the afternoon. There were bridges over both the Passaic and Hackensack rivers, and a corduroy road over the meadow between them. There was then only one house at Paulus Hook—a tavern and ferry-house kept by one Major Hunt. The river was crossed in periaugers, which were open boats with two masts, or in calm weather in row-boats. The difficulty in transportation made Newark the market town, whither many New York merchants went to buy country produce. New York got all the trade when Fulton put his twin ferry-boats on the Paulus Hook ferry in 1811 and 1812, which made it easy for the country wagons to drive on and off, and to surmount all the minor vexations, in from ten to twenty minutes. At the foot of Cortlandt street was the Paulus Hook ferry, and at the foot of Crown (now Liberty) street was a ferry across the East river to Nassau or Long Island. The boats ran three or four times a day.

The old Fly market in Maiden Lane from Pearl to South streets was the Mecca of thrifty house-keepers, who were their own basket carriers. The term Fly is a corruption of the Dutch Vlaie, hence really Valley or Meadow market. A sewer ran down under Maiden Lane and the market to the East river. At Pearl street there was an arched bridge over the sewer, with an opening guarded by a railing, through which the passing carcasses of small animals and filth in general passed on their final voyage from the city. The Oswego market was at the junction of Broadway and Maiden Lane; the Exchange, at the lower end of Broad street; the Hud-

son, at the foot of Spring street between Greenwich street and the river, which suggested its name, was also known as the Bare (not *Bear*) market, as being *bare* of produce, because it was built before a burnt portion of the city had been restored to its original condition.

At Canal street there flowed a creek, crossed by a stone bridge. There were no wharves or docks above Cortlandt street, except one close by the state prison near what is now King street; this structure subsequently became a brewery, and was torn down during the summer of 1881.

Broadway above Chambers street was a succession of green hills and valleys, the high ground sloping away on the west to the Lispenard meadows, and on the east toward the Fresh Water pond. Queen street (now Pine) and Duane street were fashionable, and the Battery was in the full flush of swelldom. Lower Broadway was occupied by little shopkeepers, saddlers, tin-workers, candle-makers, and shoemakers. The houses here rented from $200 to $600 per annum. Where is now Grand street was a range of high hills: at their foot, near the river, parties came on Sundays to carouse and eat clams. The Bowery, first an Indian trail, then a cow-path, and, still later, an indifferent road of variable width, ran out into the country: its paths were sandy and its passengers suspicious.

Old Greenwich, known once under the Indian name of Seponnike, occupied the tract of land between Canal and West Twenty-first streets, and from Fifth and South-Fifth avenues to Washington street. This contained Greenwich Lane, which boasted its monolith to General Wolfe, and the mansion of Aaron Burr, known as Richmond hill, which passed through the viscissitudes of tavern, circus, and musical garden, until the march of improvement at last drove it off the face of the land. The state prison, the ancestor of Sing Sing, was erected here in 1797.

Harlem was still a quaint Dutch village, with manners and customs of its own, with its sporting vantages of wild duck, and numerous creeks teeming with small fish. It was quite

a journey to get there by land or by water; the perils of Hell-gate beset the voyager on the river, and the noiseless bludgeon of the foot-pad on land. Yorkville was another Hounslow Heath, and Bloomingdale a Sleepy Hollow kind of hamlet, where the gentry had an almost unobstructed view of the craft upon the Hudson. Here were rather pretentious mansions, gardens, and villas. Manhattanville was also a village on the Hudson shore, with wooded belts of full grown oaks, chestnut, and hickory.

We are told that the cardinal virtue of the ancient Gothamite was hospitality, supplemented by a captivating loquaciousness; and we may well believe that the rigors of the quarantine of the yellow-fever in 1782, 1791, 1795, and 1798, and the doctors' mob in 1788, well divided the gossip with the hairbreadth escapes of the picturesque war which preceded them. The descendants of the Dutch, however, prided themselves somewhat upon their blue blood, and kept aloof from the advancing tide of all kinds of people from almost every quarter of the globe. The merchants, according to the reminiscences of a travelling player, were roisterers who came late to business, rolled barrels upon the docks during the day, then put on their evening suits and danced through the greater part of the night.

Thus feebly have we attempted to picture the times, leading oblivion into day, and in the case of the actors have we, like "Old Mortality," endeavored to deepen the indentations of the vanishing epitaphs. Let us not smile at their foibles or their juggleries for fame, their envyings or their bickerings. Let us credit their honesty just a little, their acquirements a little more, remembering that a few were doing the work of the many, and not, as now, the many the work of the few. Let us remember their yearning for knowledge, their struggles against the wolf at the door, their missed opportunities for distinction, their self-sacrifice, their ingenuity of resource, and, above all, their devoted humanity. Let us recall the fact that their surgery was without anaesthesia, and their medicine without the instruments of precision. Let our sym-

pathies be extended to the struggles of their pupilage;—let us follow them through the menial hardships imposed by their preceptors who required them to mend the quill pen, make the ink, wield the pestle, deliver compounds about the town, and be the lacquey-in-general, in return for which might be had glimpses at the library of some fifty volumes or so, and the handling of a few odd bones. Much were they called upon to do, and well, on the whole, did they do it. Pioneers indeed were they—perhaps Goths and Visigoths who conquered and defied, but came not in at the harvest nor enjoyed the vintage. Let us accord to them their meed, and in all humility ask ourselves whether another century will pass as gracious a judgment upon what abides from us.

INVERSION OF THE UTERUS AFTER SOMATIC DEATH.

By Isaac E. Taylor, M. D., of New York County.

October 11, 1888.

It is a recognised and an exceedingly interesting fact, with which we are all conversant, that the foetus is cast off from the dead body of the mother after the cessation of the respiratory movement and the complete stoppage of the circulating fluid. It is this which constitutes somatic death. The rapid cooling of the body after somatic death soon extinguishes the condition of the vital activity of the tissues.

Singular as the fact is, respecting the delivery of the child, it is still more surprising that rupture as well as inversion of the uterus has taken place. Exceedingly rare as are cases of complete and partial inversion of the uterus which have been reported, nevertheless the fact exists.

It is to this singular occurrence, after somatic death, of the inversion of the uterus, and the mechanism appertaining thereto, that I desire to solicit your attention for a few minutes, condensing my remarks as much as the nature of the subject will admit on the present occasion.

To consider the mechanism, and through what sources the inversion is created, we must take a retrospective view of natural labor, bearing in mind also the opinions which are entertained by the profession at the present day as to how the inversion transpires in the living subject.

The views of the mechanism of inversion advanced many years ago by Crosse, in his admirable work on inversion of the uterus (but which views were held a long period of time before), have merited the commendation and attention of the profession. They are engrafted firmly on the mind, and they

are considered the only correct and true explanation of the means by which the inversion takes place.

It is held without exception that the fundus of the uterus, directly or laterally, must become indented into the body of the uterus to effect the object, whether that is by traction from within the uterus, or by pressure from without from different causes.

Three important reasons or theories have been alleged as the cause in posthumous delivery of the child, and inversion of the uterus.

First theory—Spasm of the uterus, or rigor mortis.

Second—Decomposition of the tissues and fluids in the abdomen, and the evolution of gases.

Third—Contraction of the uterus consequent on the irritability of the muscular structure of the uterus, which ensues after death.

Physiology has imparted the information that muscles do not lose their irritability immediately or very soon after the death of the general system, when the circulation ceases without power of renewal, but retain it sometimes for several hours.

Physiology has nevertheless advanced no clear or positive information why the muscles of the uterus, which at the time of the death were powerless or inert, should after death, in such an extraordinary manner, and with such remarkable energy and force, deliver the child, much less turn the uterus inside out.

The commencement of rigidity is not prolonged, according to Casper, beyond seven or eight hours, though it has been from twenty to thirty-six hours. It is seldom absent, but so slight sometimes as scarcely to be noticed. It may pass off rapidly. The period which elapses before its occurrence is as variable as its duration. Both appear to be dependent on the vital condition of the body at the time of death. When it takes place later it lasts longer, consequent on the general energy of the system at the time of death. The interval between the cessation of the irritability and the accession of

the rigidity is also various. Rigor mortis, Dr. Carpenter informs us, occurs after all the irritability of the muscles has departed, and before the putrefactive change sets in.

The occurrence of the delivery of the child after the life of the mother has become extinct is consequently effected by the uterus itself, which view has been attested by high authority.

The uterus, after the birth of the child and the placenta, has been found as perfectly contracted and as firm as after natural labor. It is seldom found uncontracted and relaxed except through certain conditions. In some cases where the placenta had not been cast off, and that organ had to be removed, the uterus assumed its normal state.

The uterus is almost, if not quite, the last of the vital organs to undergo decomposition, whether before delivery or after death. It has been ascertained to be as natural in appearance, months after delivery, as at the time of death, retaining its color, form, and consistency of structure.

Rigor mortis or spasm of the uterus is considered as one if not the chief motive element by some authorities in accomplishing the delivery of the child.

When we bear in mind the important fact that cadaveric rigidity pervades most generally the whole system, it is not to be presumed that it confines itself to, or is concentrated and isolated on, the muscular structure of the uterus alone, as the vagina and vulva must be equally affected. Nor can we suppose that the rigor or spasm lasts longer than the passages themselves through which the child has to be extruded.

Second theory. The force of the gases evolved in the abdomen during the process of decomposition depends in the same manner on the nature of the decease, as well as on the condition of the system at the time of death.

The time when decomposition begins is not for some days, and after the departure of the rigor mortis. When decomposition has taken place, all irritability of the muscles of the uterus has gone. The delivery of the child under such circumstances must be consequent on the amount of pressure

on the uterus, which would necessarily be very great. On this point we also have no positive, direct, or certain evidence, or experiments which go to show the comparative strength of the muscles when in activity, or in a state of repose.

The requisite amount of propelling force is estimated to be from 5 lbs. to 40 lbs. to accomplish the delivery of the child, according to its size in natural labor, assisted by the thoracic efforts and the abdominal nisus.

Joulin held it as high as 80 lbs., and he considered that the abdominal nisus had very little power. Other authorities deem it equal in power to the contraction of the womb. If the views and experiments of Joulin are true and correct in the living subject, without other assistance, how much greater propelling force, from whatever source, would be required to deliver the child after death, and to effect an inversion of the uterus? It certainly would appear to require a greater amount of pressure after the irritability of the uterus had departed, and especially should the rigidity of the maternal passages still exist.

Casper has asserted that it is extremely difficult to break up organic cohesion of dead organs, as dead tissues have more strength than the living.

In easy labor, where the child is small, or even of the ordinary weight, and the capacity of the pelvis ample and the maternal passages prepared for dilatation and expansion, there being no hindrance in the way, the child is born quickly and rapidly. In some cases, as we all have recognised, the contraction being active, the child has been driven into the world, the placenta following, by one continuous, persistent action, and the uterus left well contracted afterwards.

Third theory. Contraction of the uterus.

Foederé informs us that labor takes place spontaneously after the death of the mother, by the expulsive force of the uterus alone, in which the organic action is concentrated after death.

Arbiter, in 1862, gives the following report: An hour after a woman had died undelivered, he extracted a child by ver-

sion, and took out the placenta. When removed the uterus contracted to the size usual after natural labor, and was left well contracted and firm.

Dr. Walter Coles, in his paper read before the St. Louis Medical Society, September 24, 1887, on post mortem delivery, gives the history of a case of inversion of the uterus. At a recent inquest held in this city upon the body of a young woman far advanced in decomposition, the uterus was found inverted and protruding from the vaginal outlet, when a foetus of about three months, with its membranes, was discovered in the clothing cut from the corpse.

In a discussion before the Medico-Legal Society of Paris, 1878, Pinard related the following: A young woman died in July, 1872, about the fifth month of gestation, and when the body was raised to be put in the coffin, thirty-six hours after death, a foetus fell from between the legs of the corpse. On examination, the uterus was found inverted, and protruding from the vaginal outlet with the placenta adherent.

Dr. Braxton Hicks, of London, stated before the London Obstetrical Society, two years ago, that he had observed two cases of inversion of the uterus after post-mortem delivery, one of them being partial and the other a complete inversion of the uterus (he does not however state whether they were at full term or not). One of the cases occurred an hour previously, and the uterus was found well contracted; the other was so firmly contracted as to defy all efforts at reduction.

Dr. Bedford, of Sydney, Australia, reports this case: On the 30th of June, 1884, he exhumed the body of a woman aged thirty-seven, who died on May 27th, undelivered of her seventh child. A question of malpractice was entertained. The age is not stated, nor is the time of gestation, but possibly it was before the full time. On examination the abdomen was found distended, and the body of a male child discovered, the head toward the feet of the mother, and the feet under the uterus, which was inverted with the placenta attached. A transverse rupture of the uterus, about six inches, had taken place above the cervix, the uterus not contracted.

I have selected only these few cases, with the cases of inversion at three and five months, as amply sufficient to draw attention to the important fact that contraction of the uterus is the all potent and sole motor element in producing the birth of the child; and not only that, but from the cases of Hicks, that the contraction and firmness of the uterus remain for some time after inversion, and that reinversion was impossible by human aid, demonstrating how powerful must be the force requisite to deliver the child during the time the irritability lasts. Is it possible that the temporary stay of the rigor mortis, or the distention by the accumulation of gases after all irritability has passed, could do this so effectually?

In the recorded cases of inversion of the uterus in the living subject, the instances related appertain to the full term, after natural labor, with the placenta delivered most generally. In the case at three months the whole ovum had passed; in the case of five months the placenta was attached.

Having premised and referred to the several causes effecting the birth of the child after somatic death, and given the rare instances of inversion of the uterus, not only at term, but especially at the early months of gestation, as well as showing that the appearance of the uterus after decomposition had occurred was similar to that after natural labor, I shall attempt to elucidate the mechanism of inversion of the uterus after death from an opposite stand-point to that which is held by the profession in many cases as regards the living subject.

Recognising the perfectly established fact, adduced by the investigations of high anatomical authorities for the last twenty-five years, that the cervix uteri and os are composed chiefly of circular contractile fibres and non-contractile elastic fibroid tissue, and that the longitudinal muscular fibres, posteriorly and anteriorly, are located in the body of the uterus solely, and terminate at the junction of the body and cervix, and that they have no dominating power, as some assert, over the cervix, in shortening or pulling it back, or

expanding it, except by propelling force, the cervix uteri and os are governed and controlled in natural labor, as we all know, by the cerebro-spinal system of nerves, or the reflex system, and the body of the uterus and fundus, which are the great motor or propelling power for delivering the child, are governed and dominated over by the great sympathetic nerve system.

The nature of physiological labor is contraction of the uterus, followed by repose, and this alternating action continues until the delivery of the child and placenta. Without the contractile fibres existing in the cervix it would be impossible to account for the sudden contraction of the cervix-uteri, without which contraction, taking place immediately or very soon afterward, there would be in many cases a fatal issue.

The non-elastic element of the cervix, in its natural character, dilates simply by mechanical expansion and distention. In natural labor the cerebro-spinal or reflex system of nerves is held in abeyance when apoplexy, coma, or paraplegia exists; and this is held to be sufficient to afford positive and conclusive proof that the uterus is, in natural labor, altogether independent of the nerve centres.

In posthumous delivery the cerebro-spinal system is lost, is dead. The circular contractile fibrous tissue of the cervix is only amenable to pressure from the mechanism of expansion and dilatation by the head of the child, and there being no impediment in the way while the irritability exists, from one to two or three hours, the child is driven by one steady, persistent, and continuous action of the uterus into the world, with the placenta cast off or not; the contraction continuing, inversion follows, the lower segment of the uterus—the cervix—becoming inverted first. The body is unfolded, and the fundus escapes or is rolled out, and the uterus is turned inside out, the fundus being the last to be delivered.

I now present you, independent of the cases at five and three months after death, a correct drawing from nature of a case of inversion of the uterus in the unimpregnated uterus,

taken from my former paper, 1872, showing the mechanism in the living subject.

The advocates who favor the indentation theory of the fundus uteri first (with which I am also in accord in some cases) as the antecedent cause of inversion of the uterus, whether in the active or passive form, consider that the abdominal nisus and the respiratory act, as well as the impulse of the intestine, with in some cases traction on the cord of the child, produce the inversion. If this were so in the passive form, could such a view be tenable when the uterus is in active contraction?

It is believed that the force is nearly if not quite as direct, and equally efficient, as the propelling force requisite in natural labor. Joulin informs us from his experiments that the thoracic force or power and the abdominal nisus are scarcely equivalent to a few pounds. Klob insists that it is absurd to believe that pressure of abdominal nisus is the cause of the protruding inward in the living subject of that part of the uterus where the placenta was located, and which part in consequence of that indentation was paralysed.

How, may I ask, could this have transpired in the early cases of inversion, as related at five and three months after death, or in the unimpregnated uterus in the living subject?

The fundus of the uterus, according to T. Smith and others, must be the introcedent body first, to accomplish the inversion in the active, spontaneous form.

Others hold that the paralysed part, to which the placenta was attached, falls in, and thus becomes the source of the commencement of inversion.

In regard to pressure, Robert Lee gives us the result of his numerous post-mortem investigations. He says,—"On examining the bodies of women who have died soon after delivery, I never saw the uterus in such a state of relaxation as to render it possible for the intestines, however forcibly driven against the fundus of the uterus, even in vomiting, straining, or coughing, to produce inversion of the uterus."

The uterus has been recognised after post-mortem delivery

as firmly contracted, undergoing no relaxation, as after natural delivery. When once contracted after the birth of the child, and the placenta cast off or not, inversion having taken place, the contraction may remain firm and solid for a short time, as it could not undergo any modification or change in its structure, demonstrating that, even after inversion, it defies the strongest power to reinvert it while the posthumous irritability exists. Now, how is it possible, as in the living subject, to believe that a contracted uterus, fundus, and body should become the introcedent cause to excite the contraction spoken of after death (as the irritability is only from one to three hours' duration), and, before rigor mortis or spasm occurs, that the fundus should be indented and driven through the cervix-uteri, and the uterus become inverted? Or how could we believe, with the illustrations which I have adduced, that paralysis must exist at the site where the placenta was attached, especially in those cases of three and five months of pregnancy, or in the unimpregnated state in the living subject?

From the suggestion I advanced years ago, in 1872, respecting the mechanism of inversion of the uterus in the living subject, and which has been recognised since then in some instances, I entertain the belief that the investigation into the mechanism in posthumous delivery of the child and inversion of the uterus after death, tends to demonstrate it more clearly, and ratifies the opinion as expressed, that the mechanism is the same in the dead as in the living subject, which is that the inversion is effected by one continuous, persistent contraction of the uterus. As there is no repose of the contraction, the child is extruded, the placenta following or not; the cervix is unfolded first, then the body, and the fundus last. The inversion is therefore from below upward instead of from above downward. With this investigation respecting the inversion of the uterus after somatic death, I am impressed with the idea also that the cases may be found as great as in the living subject. I could not yield assent to the rigor mortis view, isolating on the uterus alone its action

(which is of short duration), after the irritability of the uterus has departed, nor believe that decomposition could have any influence, as the pressure of the gases would not be powerful enough to accomplish the inversion, should the child be delivered, or to support the indentation theory.

Now "Cui bono?" I leave these views and investigations with you. You will please accept the brief I have given; con it over, and I trust that your decision will not be rendered in accordance with the Scottish verdict, "Not proven."

DISCUSSION.

Dr. C. A. Leale, of New York county, said Dr. Taylor had presented a theme of great medico-legal importance. A physician is called to a house; he is ushered into a room; he sees before him a dead woman and a delivered child. The medico-legal interpretation of such a case decides not only the entire disposition of all the property belonging to that mother, but also the legal possession generally by the living father. If the child lived a moment after its mother's death, it then became the inheritor of the entire possession of that mother, if she died without making a will. If the child subsequently died, then the father became the direct successor of his child, and he by law in many of our states would inherit all the property belonging to that mother. On the other side of the question, if the child died prior to the death of the mother, then an entire change took place. The child had no legal status, as the mother remained in the possession of her property after its death. The mother then dying last, and dying with her property, without leaving any will, her property would revert to her direct heirs, who are altogether on her side, and the husband would be left without any claim or right to her possessions.

The lucid manner in which Dr. Taylor had presented this important subject merited the gratitude of all his hearers.

ADDRESS IN OBSTETRIC MEDICINE.

By GEORGE TUCKER HARRISON, M. D., of New York County.

October 11, 1888.

Mr. President and Fellows: When the request of your Committee of Arrangements was conveyed to me, that I should deliver an address in obstetric medicine at this annual gathering, I was naturally highly gratified at such a proof of esteem, but any feeling tending to self-gratulation was soon chastened by the reflection that my performance must fall far short of what I deem worthy of the occasion. Let me, then, at the outset ask your indulgence for any shortcoming your critical acumen will detect in the remarks to which I now have the honor to invite your attention. The elevation of obstetrics to the rank and dignity of a science is of quite modern date, and we may confidently affirm that its origin goes no farther back than the beginning of the second half of the present century. With the rise and development of natural scientific medicine goes hand in hand modern obstetrics. According to Virchow,—"Medicine, as an applied natural science, thrives only on the broad ground of the entire natural sciences;" and this apothegm is the credo of modern medicine, including obstetrics. Calling to its aid pathological anatomy, and availing itself of the great advances recently made in physiology, histology, and aetiology, modern obstetrics has proposed to itself a vast problem; that is, to investigate the physiology and pathology of pregnancy, child-birth, and the puerperal period. It need scarce be said that the solution of this problem is but in its beginning. The light, however, that has already been converged upon it has illuminated many dark places, and furnishes an incitement to increasing effort. The first subject naturally to which scientific obstetricians directed their attention was

normal labor, the physiological process of the expulsion of the foetus and placenta, and the manner in which the uterus participated in the process.

As epoch-making may be designated the section of a frozen cadaver of a parturient woman, which Brown published in the supplement to his topographical anatomical atlas, in view of the more accurate knowledge it gave of many processes occurring during labor, and in view of the stimulus it gave to similar preparations by Waldeyer, Chiari, Chiara, Schroeder-Stratz, and Benckiser-Hofmeier. To Schroeder and his pupils, especially, modern obstetric science owes an impayable debt of gratitude for the beautiful researches they made in regard to the behavior of the cervix and corpus uteri during pregnancy and child-birth. According to these investigations a section is found in the parturient uterus so characterized that it intervenes as a distended and thinned part between the upper thickening portion and the cervical canal below. This section is the "lower uterine segment." In the unimpregnated uterus a part lies above the internal os uteri, between the latter and the firm attachment of the peritonaeum, characterized by the loose adherence of the peritonaeum to the muscular tissue. In this part a number of muscular fibres or lamellae go to the mucous membrane, but externally very few fibres originate from the peritonaeum, and these fibres lie far apart in their origin. There is, consequently, in the parturient as in the unimpregnated uterus, "a lower uterine segment," which differs from the remaining body, as well as from the cervix. It can be plainly recognised, also, in the impregnated uterus. In the beginning of pregnancy this part thickens with the remaining portion of the uterus, but retains this condition longer than the upper part. Toward the end of pregnancy, however, a thinning can take place. "The lower uterine segment," as the studies of Hofmeier have demonstrated, is farther characterized by the mode of its arterial supply, which serves to explain many physiological and pathological phenomena formerly quite unintelligible. "The behavior of the arteries," observes

Hofmeier, "is always the same, independently of slight modifications." According to his description, after giving off some rather large branches to the cervix and upper part of the vagina, the uterine arteries run parallel to the upper part of the cervix, and only furnish the first large branch to the uterine tissue at the place of firm attachment of the peritonaeum, and from this latter point "the lower uterine segment" is supplied by half recurrent twigs. We can now understand how it is that during labor the uterus is functionally differentiated into an upper, active, and a lower, passive, part. The functional separation does not correspond to the anatomical division between body and cervix, but the lower portion of the uterine body, "the lower uterine segment," is excluded from the function of the upper part of the uterine body. The physiological function of these two sections is directly opposite, the upper, the hollow muscle, contracts, becomes smaller and thicker in labor, while the passive part is distended to a wide, flabby sack. The lower boundary of the hollow muscle, which contrasts sharply with the distended tube below, as soon as uterine contractions occur, was happily designated by Schroeder as "ring of contraction," since in this circle the effective contractions come to an end. It has not been certainly ascertained, hitherto, in what way the formation of the ring of contraction is effected. One fact, however, has been established beyond peradventure, and that is, that it corresponds to the lower boundary of the firm attachment of the peritonaeum.

The researches of Hofmeier and Benckiser confirm the doctrines taught by Dr. Isaac E. Taylor since 1865, that the cervix remains in its integrity up to the end of pregnancy. Moreover, they prove conclusively the correctness of Schroeder's views, that the cervix retains in pregnancy its characteristic mucous membrane, while "the lower uterine segment" is invested with true decidua. The mechanism of labor, the mode in which the child's head enters and passes through the pelvis, has lately received renewed attention, and the studies of Veit form a valuable contribution to this

theme. Few medical subjects in the last few years have been more carefully studied and more thoroughly discussed than the mode of detachment and expulsion of the placenta in normal labors, in consequence of which a reactionary movement has taken place against the general adoption of the Credé method. For my own part, from careful clinical observation, I can heartily concur in the views advocated by Schroeder on this subject. As he correctly states, if the parturient woman be left to herself, we may readily convince ourselves of the fact that the detachment of the placenta and its expulsion from the hollow muscle (uterine body to "the ring of contraction") takes place with great certainty and in a comparatively short time if left to the natural forces, but that the placenta can remain for a long time in the passive portion (lower uterine segment, cervix, and vagina). Farthermore, it is observed that the spontaneous detachment and expulsion of the placenta is usually accompanied by but slight bleeding, haemorrhage to any extent being a very rare event. The rule of practice based on these views will be, then, to wait quietly until the diminution and ascent of the uterine body and the bulging above the symphysis show that the placenta is expelled from the hollow muscle beneath the ring of contraction, and, thereupon, by gentle pressure, to facilitate its passage through the vulva. The Credé procedure I would reserve for cases in which the placenta does not become detached, or those in which it has been separated in the way described by Duncan, and consequently has remained with the upper edge fixed in the uterine body. This method would be indicated likewise when there was some obstacle which prevented the placenta from escaping completely out of the uterine body, as, for example, might occur when a very large placenta had to pass through a moderately contracted "ring of contraction." The doctrine of the narrow pelvis, founded by Michaelis, has been of late years developed to large proportions by the exact scientific investigations of Litzman, Rokitansky, Von Meyer, Breisky, Leopold, Fritsch, Neugebauer, Lusk, and others. The aeti-

ology especially of spondylolisthesis has been studied by Neugebauer in the most careful and searching manner, and he has succeeded in enlightening this subject very satisfactorily. The recent contribution of Prof. Von Meyer, of Zürich, has still farther enlarged our knowledge upon this form of narrowed pelvis.

Modern obstetrics may justly boast of having brought within the circle of its investigations a domain but recently entirely ignored,—that is, the diseases of the decidua, of the foetal appendages, and those of the entire organism which are evoked by pregnancy. Among the latter there is no malady which at times may embarrass the practitioner more than hyperemesis, the problem being how he shall proceed in a given case; whether artificial interruption of pregnancy is indicated or not. Under these circumstances the skill and judgment of the physician are taxed to the highest degree.

The subject of eclampsia of recent years has called forth many valuable papers, and, as you are aware, was ably discussed before this Association two years ago. While it cannot be said that the result of these studies and discussions has been to illuminate the essential nature of eclampsia, yet it can be maintained that the problem is pressed nearer to a solution. Our present theory, at any rate, does not do violence to the facts, as was the case with the assumptions of Fredrichs, Traube, Rosenstein, etc. According to this theory, as stated by Zweifel, a stasis of the urine, an obstacle to its secretion, is caused at times by the pressure of the uterus on the ureters. As a matter of course, if this obstacle lies in the kidneys themselves, the explanation is the same. The urine, when retained in the organism, poisons the nerve-centres, and evokes an increased reflex excitability.

Labor pains give the incitement to the outbreak of the convulsions and coma (vaso-motory neurosis). The clinical phenomena of the disease are brought forth by the concurrence of urinary retention and uterine contractions.

In passing, we must mention the increase of late in our knowledge of the physiology of the foetus, largely due to the

researches of Preyer. Farther, the transition of matters from the maternal blood to the foetal has been recently the subject of much experimentation. That substances dissolved in the maternal blood can pass over into the foetus has been demonstrated by Gusserow, Fehling, and others. The transition of formed elements has, moreover, been demonstrated, not only experimentally in animals, but also by experience in man. The fact that in variola of the mother the foetus in utero can likewise be affected, and, on the other hand, the fact that vaccination of the mother can render the foetus insusceptible to vaccination, prove conclusively that molecular substances can go over to the foetus.

Of all the acquisitions of modern obstetric medicine, however, none can vie in importance with those derived from the application of antiseptic principles to this branch of medical science, and the discovery of the transmissibility of septic diseases. It was the great merit of Semmelweiss to have first shown, by a train of reasoning based on wide induction, what was the true origin of puerperal fever. Before his day a dreary darkness rested upon this subject, which only cleared away before the uprising sun of his exact investigations. It is a sad thought that he did not live to see the triumphant vindication of the correctness of his generalisations and enjoy one of the greatest blessings that it is given to man to realise on earth—I mean the satisfaction of having conferred upon mankind an inestimable boon by the discovery of a great truth. His colleagues, instead of setting to work to test the correctness of his theory by an examination of the facts, wasted their energies in theoretical discussions. The reason of this was doubtless three-fold. In the first place, the age was not ripe for his discovery—the question of the infection of wounds was too little understood; secondly, the adoption of his views involved such a revolution in current opinions as must awaken in every obstetrician a feeling of blame for his past errors; and, thirdly, Semmelweiss advocated his views with such intensity and passion, and so overwhelmed his opponents by the violence of his invective, as to call forth bitter

opposition. The consequence was that his wonderful work on the aetiology and prophylaxis of child-bed fever, which appeared in 1861, was almost totally disregarded. The general recognition of the truth of his doctrines came later, when, as a consequence of Lister's method of treating wounds, bacteriological investigations began to be cultivated, and the doctrine of the potency of micro-organisms in the production of disease came into existence. But while general unanimity exists in regard to the truth of the doctrines of Semmelweiss, the temperature of the puerperal condition still constitutes a debatable ground on which the most antagonistic views prevail. By some, every elevation of temperature in the puerperal state is regarded as pathologically significant, and must be considered as a fever due to infection, even if it is impossible to give a definite explanation of its aetiology; while, on the contrary, others maintain that transitory elevations of temperature are incident to the healthy puerperium. Doederlein[1] has lately undertaken to enlighten this theme by investigations in regard to the occurrence of schyzomycetes in the lochial discharges of the uterus and vagina of puerperal women, and farther by studying the effects of inoculation of rabbits with these discharges. The result of these investigations he enumerates as follows:

1. The lochia of the uterus under normal conditions do not contain any schyzomycetes.
2. The lochia of the vagina under normal conditions contain innumerable germs of the most varied kinds.
3. The lochia of the uterus can be incorporated in the animal body in any mode or quantity at pleasure without reaction.
4. The lochia of the vagina are competent to call forth infection in animal abscesses.
5. The presence of germs of any sort in the puerperal uterus causes elevation of the temperature, as a rule.
6. After the cessation of this elevation of temperature the lochia of the uterus are again devoid of germs.
7. The removal of these germs ensues by the increased secretion and discharge of pus cells.
8. Even before the elevation of temperature, germs are found in the

[1] Archiv. für Gynaekologie.

uterus. On the one side, a certain time of incubation must be assumed. On the other, especial exciting causes must be brought into play; as, for example, assuming the erect posture, in order to bring to expression the slumbering noxious agent.

9. The uterine lochia, which contain germs in fever, evoke in animals phenomena of infection.

10. When they only contain isolated germs, in which case the clinical disturbance is quite slight, they produce no injury on the animal.

11. The vagina can also contain pathogenic germs (auto-infection), when no internal examination has been made.

12. The uterine lochia of sick puerperal women always contain germs, the streptococcus pyogenes being found always, without exception.

13. The immigation of germs into the uterus can take place without an examination, an operation, etc. (auto-infection).

Czerniewski,[1] as the result of his bacterioscopical studies, has attained to the following results:

1. In lochia of healthy puerperal women we find micro-organisms in the uterus cavity very rarely, and only as an exception; hence it follows,—

2. That the lochia of healthy puerperal women possess neither pyogenic nor phlogogenic properties (ott. Doederlein).

3. In most cases streptococci may be demonstrated in the lochia from the uterine cavity of puerperal women slightly diseased, which may be proven by control experiments and injections.

4. In puerperal cases terminating fatally (septicaemia, lymphatic form), streptococci develop in cultures from the lochia, as also after death in cultures from all fluids and organs.

5. The streptococci are the same in slight as in fatal puerperal diseases.

6. The streptococci present in puerperal diseases can evoke both abscesses and erysipelatous inflammations of the skin.

7. In the diseased organism the streptococci lead to a degeneration of the parenchymatous organs, and to hyperaemia of the serous tissues with greater or less exudations.

If farther investigation should demonstrate the correctness of these conclusions at which Doederlein has arrived by his experiments, and which are partially confirmed by Czerniewski's studies, it would follow as a logical necessity that our views, to a certain extent, must undergo a modification. The disinfection of the vagina during labor would be indicated to

[1] Archiv. für Gynaekologie, Bd. XXXIII, Hft 1, p. 101.

a much greater degree than was formerly thought to be necessary when the innocuousness of any germs found in the vaginal secretion was maintained. If the term auto-infection be used in these cases, it must be expressly insisted upon that the noxious substances have not originated in the organism itself; they must in all cases have been imported from the outside, if not by foreign intervention, by the affected individual herself. It is certainly a ground for thankfulness that, owing to the development of asepsis in the conduct of labor, the greatest danger which formerly threatened the lying-in woman, puerperal fever, is now under our control. Corresponding to the advance in aseptic surgery, modern operative obstetrics can boast, if not of new operative procedures, of what is better, *more favorable* results. What grander achievements can be mentioned than the improved method of Saenger for the performance of the Caesarean section? The operation of laparo-elytrotomy, the admission of which into the list of operative procedures available in cases of narrowed pelvis, we owe to the masterly skill and ability of Dr. Thomas, must be considered as one of the splendid acquisitions of recent times. In the therapeutics of extra-uterine pregnancy, the proposal was made by J. Veit, and carried into successful execution, to perform laparotomy and extirpate the foetal sac before the latter had burst. Veit has operated in this way a number of times since, and Hofmeier likewise. Dr. Janvrin is an earnest advocate of this operative treatment of extra-uterine pregnancy in the early months, as soon as the diagnosis has been made and before the sac has burst. Kelly, of Philadelphia, and Hawley, of this city, have each operated successfully under these circumstances. When the obstetrician, however, is not called until the sac has already burst, and the patient is threatened with death from internal haemorrhage, the success of Lawson Tait especially would seem to indicate that it is his imperative duty in such a case to perform laparotomy and secure the bleeding vessels. The technical difficulties regarding the operative treatment of extra-uterine gestation, especially in the latter months of

pregnancy, have not been as yet entirely overcome; but still immense progress has been made, and we may hope that the day is not far distant when they will yield to advancing knowledge.

In conclusion, let me call upon you, one and all, to contribute what you may to advance the grand cause of the increased safety of the pregnant, the parturient, and the puerperal woman. The imperfect sketch I have given of what is the product of modern research and effort gives us cause of gratitude that our past achievements have been so glorious, and should animate us with increased zeal to persevere in the same direction. We must still strive after the discovery of truth, although, as Lessing says, the full truth is for God alone. The field that lies before us and invites to careful cultivation is both wide and fruitful. There is room for many laborers, and the harvests to be gathered are richer by far than golden.

TRAUMATIC GANGRENE.

By Thomas H. Manley, M. D., of New York County.

October 10, 1888.

I am led to present an article on the above subject because it has been my fortune, during the past few years, to see, in and out of hospital, many very interesting cases of this disorder, and while there was nothing unusual in the course each assumed, it may not be without interest to record three or four of them, and afterward to dwell on a few points of very much importance,—the causes, consequences, and treatment of mortification.

In doing so I shall aim to be plain and practical rather than to offer too much speculative theory. The discussion of this phase of disturbed nutrition cannot fail to be of great interest to the general practitioner as well as the surgeon, especially to the former, who is often compelled to decide questions of saving life or limb without the opportunity of consulting with an experienced surgeon.

Moist gangrene of a limb is rarely seen in general practice, and not often in a well conducted hospital. Generally when a limb is so crushed or mangled that saving it appears impossible, the destruction of the part is anticipated by amputation or excision; and, beside, wounds and injuries are mostly so intelligently treated that the death of a part seldom occurs: hence the reason why this rare and peculiar sequel of a wound may, by its insidious development and often very rapid course, escape the notice of a medical attendant until it is too late to spare a limb which might have been saved.

When it is found, however, that inflammation has ceased and mortification has commenced, we are confronted with a

most serious question, to which I shall request your attention, for on its wise and judicious settlement not only depends your patient's life, but his future usefulness as well. It is the question of amputation while gangrene is in a spreading state.

I am pleased to be able to report five typical cases which have come under my immediate care recently, all of very great interest, for they separately presented different phases of this morbid state seldom met with, and I believe even to-day very imperfectly understood.

My first case was a middle-aged man, mortally bitten by a rattlesnake. He was brought into the 99th Street hospital at midnight, on the 12th of June, 1885. During the evening of that day he had been exhibiting his reptiles in one of our parks. After supper, according to announcement, he gave a performance in his tent, which consisted in calling the snakes out of their cages and putting them through various movements, when one, which he had teased with his whip, suddenly turned and with a vicious snap sunk his fangs deeply into his trainer's fore-arm.

The unfortunate fellow, who was vigorous and muscular, at once became faint and dizzy, sat down and tried to get up, but fell on his knees. He soon had chills, with cold extremities, and his strength entirely gave way. Whiskey in large quantities was administered, and heat applied to the extremities. During this appalling collapse his mental faculties remained intact, and, though he could neither speak nor move, it was apparent that his mind was unclouded.

On reaching the hospital he had somewhat recovered the power of speech, and a moderate reaction had set in, though he was yet extremely prostrate. The pulse was feeble and fluttering, 130 beats to the minute; the features sunken, and of a peculiar cadaverous expression; the pupils were dilated and the eye of an unnatural lustre.

Such is the record of the case as given me by our estimable house surgeon, Dr. J. B. Spaulding, at that time on duty. The case was first seen by me in the evening, at 7 : 30, when all hope of saving the injured arm was abandoned.

At this time the forearm, which was bitten, and all the tissues up to the shoulder, were dead to sensation, and immensely swollen, the skin of a yellowish gray color, the finger-nails black, and the whole limb motionless. In the immediate vicinity of the puncture there was an area about the size of a half dollar, of marble whiteness.

The man now was evidently sinking, and as the infection had extended beyond the shoulder joint, nothing could be hoped from amputation, even

if he could stand its shock. From the time of admission into hospital everything had been done to sustain his strength. Alcoholics were freely given, with ammonia, camphor, and opium, but without avail. He died in the morning at 11 o'clock, just eleven hours after admission.

This case demonstrated how rapidly gangrene may spread from the bite of a venomous reptile. For more than six hours preceding death, and within five hours after the injury, the whole arm to the shoulder was in a state of sphacelus, thoroughly dead, dark, and withered; blebs on the skin, scattered about, from the finger-tips up; the skin denuded here and there, where it happened to be rubbed against in handling,—the whole emitting a foul, sickening odor.

A most painful feature in this case was, that while death was actively creeping up to the vitals, and the limb was rapidly undergoing decomposition, the mind was untouched, and the unfortunate patient was extremely anxious that his life might be saved.

It seemed to me that with appropriate measures this man's life might have been saved, had they been applied promptly on the reception of the injury. If the bitten part had been fully dissected out, allowed to bleed freely, and then thoroughly cauterised with the hot iron, before the venom had been diffused into and through adjacent tissues, and had paralysed the nerves and destroyed the circulation. It was some time, however, before an ambulance was called, and when medical assistance arrived the poison had entered the general circulation, and little could be done. A post mortem was not permitted.

In my second patient, though he had to part with an arm, he got off with his life. This case, also, illustrates the speedy onset of gangrene, and the sudden transition of inflammation to mortification, and what may be sacrificed by oversight, or even by a few hours' delay.

A man, 38 years old, a tinsmith by trade, leading a regular life, generally in good health, lived in a tenement house, the first floor of which was occupied as a butcher's shop. On a very hot night in July, 1887, he left his bed at nearly midnight, in his night-clothes, and went to the win-

dow to make himself more comfortable. The sill of the window was quite near the floor. He intended merely to get a little fresh air, but, overcome with the weariness following a hard day's work, he was soon lost in sleep. How long he slumbered he hardly knew, but it must have been some hours, for it was dawn when he was discovered.

While in this unbidden sleep he lost his balance and went out through the window, first striking an awning, when he was awakened. He now rolled over and over, quickly, gliding towards the flags, but in the course of his rapid descent his right arm, at the flexure of the elbow, on the inner surface, was transfixed by one of a row of butcher's hooks, which tore up all the tissues to the bone, and was only arrested at the wrist by the tough ligamentous tissues which form the joint. Here he hung suspended for nearly half an hour, when his loud shrieks brought an officer, who released him from his perilous position.

When brought to the Harlem hospital he was suffering from shock, and stimulants were freely given. He complained but little of pain. On examination of the wound, by Dr. Robert Lewis, the house surgeon of the hospital, there was very little haemorrhage, though the brachial artery was torn completely across, just below where it emerges from under the bicipital fascia. The hand was now quite cold, with no evidence of circulation.

The wound was immediately dressed, beginning with the ligation of the large artery, thoroughly irrigating the furrow made in the tissues, inserting drainage-tubes, and sewing the whole up from end to end. Over this iodoform was freely sprinkled. Gamgee absorbent cotton and firm gauze bandage, the whole supported and heat maintained by the hot bottle.

I saw the man six hours after the injury, and critically examined the fingers, the only parts exposed, and found that the circulation was being reëstablished. There was little swelling at this time, and though the hot bottles had been some time removed, natural warmth had been maintained. He said he had his usual feeling in the hand, did not complain of pain, and looked well. His pulse was but little accelerated, and, indeed, with a good collateral circulation, it seemed that he might soon recover, without any serious detriment to the usefulness of his arm.

The morning dressings were undisturbed, and things allowed to remain as they were. He passed a quiet, uneventful day, but toward evening the temperature went suddenly up to 103°, when he became very restless and thirsty. The thumb and fingers underwent considerable swelling and increase in heat, and he complained of severe pain along the course of the wound, extending into the fingers. It was now evident that collapse had passed away and reaction set in, and nature had attempted restoration.

I had anticipated this at my morning visit, and directed the house surgeon, if there was much pain and swelling, to release the sutures and

loosen the dressings, which he did, much to the relief of the sufferer. As day passed into night he became more and more uneasy, constantly complaining of a severe burning pain in the arm and elbow-joint. His pulse at midnight was 130, hard and bounding, and the thirst persistent. With the advent of early day he became much more easy, and slept three hours. After awakening he felt much easier and had no pain. There was, however, great bodily weakness, so that he could hardly move in the bed.

In going through the wards, at about eleven o'clock, I was much surprised at this man's changed appearance, and concluded at once that the wound was not doing well, though the house surgeon assured me that two hours before everything appeared to be progressing favorably. To my interrogatory, strange to say, he replied that he felt first-rate. He was immediately removed to the surgery, where, on examination, I found the hand stone cold, the finger-nails blue, the skin puffed and boggy. In fact, the whole, up to and above the elbow, was thoroughly gangrenous. The scalpel could be plunged in anywhere up to four inches above the elbow, without evoking the slightest sensation.

The dividing line of life and death, though not visible to the eye, could be more or less defined by the circulation and sensation. Up to the insertion of the deltoid muscles the parts were quite devoid of life, but at this point there was a striking difference in the color of the blood let out on incision.

Now we had before us a case of great gravity, one which emphasised the insidious and treacherous nature of this disease, and the serious developments which may follow in a wound, even under the most intelligent treatment; and here, too, came up the question, When is operative interference justifiable? Should we wait for nature to divide the healthy from the diseased tissues, or should we take time by the forelock and do that by art which nature tediously and imperfectly performs?

It seemed only too apparent to me that gangrenous infiltration was rapidly spreading upward and propagating its deadly ichor in the direction of the body, and that its extension but a few inches farther, involving the shoulder-joint, would render relief by operation impossible.

Ether being administered, the limb was removed at the shoulder articulation. The patient made a good recovery, the wound healing by primary union, and he left the hospital six weeks after admission in good health.

My third case, like this one, well illustrates the propriety as well as the imperative necessity, at times, of amputating while gangrene is spreading, and also teaches the lesson, always to be borne in mind by the medical attendant, that a comparatively trifling injury may, if not intelligently treated,

or if its nature is not well understood, end in the loss of a limb, or of life itself.

My subject in this case was a man of forty years, in sound health, an engineer. On the 12th of January of this year he had the big toe of the right foot crushed by being caught between the sill of a door and the platform of an elevator. A practitioner in the neighborhood was called in, removed the nail, which was partly detached, and the first phalanx, taking his flap from the under surface of the toe, and bringing it forward to the point where the bone was disarticulated, and dressing the whole with all modern antiseptic details.

After a week or more I was invited by the wife to see him, but declined unless with the regular attendant. A few days later a consultation was held, when it was decided to remove the first phalanx of the adjoining toe. As this operation was followed by the same torturing pain, and the man was now neither able to eat nor sleep, and losing flesh daily, his wife insisted that I must be called in. The doctor consented, and three weeks after the injury I again saw the case in consultation.

At first sight it seemed to me that the limb was doomed. The foot was immensely swollen, boggy, and, on the inside, discolored and cold. On critically examining the parts I found more or less warmth in the three outer toes and external part of the foot. I advised immediate amputation of the affected parts, and four hours later I amputated. We found all the phalanges of the big and middle toes necrosed, and their metatarsal bones as well; the fleshy tissues were broken down, disorganised, and soaked in a sero-purulent liquid of a vile odor. The most difficult feature in the operation was to decide exactly how far to cut and not include contaminated tissues. We gave the patient the benefit of the doubt, and removed as little as possible.

Though we used no tourniquet, we had no haemorrhage of any account. This I feared was a bad omen, as we all know how extremely vascular this region of the body is. The morning after amputation the remaining part of the foot looked anything but favorable. Large blebs had formed on the dorsum of the foot, the swelling remained, and the whole was rather numb to the touch.

As the people were in rather limited circumstances, and the apartments not the most healthful, it was decided to send him to the hospital. Accordingly the same day he was admitted into one of my wards at the Harlem hospital. I immediately sent for Dr. F. S. Dennis, one of the visiting surgeons to the hospital, for his advice in the case. He promptly responded, and at 5 P. M. Dr. Dennis, with Dr. John G. Truax, saw the case with me, and recommended delay, awaiting farther developments.

The ultimate favorable and rapid recovery of the part quite amazed me. It healed quickly by granulation, soundly and compactly. He

returned to his place at the engine just six weeks from his entrance to hospital, with a fairly useful foot, and now, though a little stiff in his gait, there is scarcely any perceptible lameness.

CASE IV. L. B., 18 years old, admitted into Harlem hospital June 2, 1888. His horse took fright, and he was thrown from a wagon against an iron post of the Elevated Railroad. When picked up it was found that he had sustained a compound fracture of the lower third of the radius, and a compound dislocation outward of this bone, with the ulna, at the wrist joint.

On admission to hospital he was suffering considerably from shock. The parts were thoroughly cleansed, the dislocated and fractured bones adjusted, the whole enveloped in iodoform and sublimate gauze, and retained in position with well padded splints.

Dr. Dennis, who had charge of the case in its early stages, saw the injury for the first time June 3d, the day after admission. By his directions drainage-tubes were inserted, and the most thorough antiseptic precautions observed. On the 3d day after admission the patient complained little of pain, but now the ulnar side of the hand seemed to have lost some of its natural warmth, and the skin was of a rather suspicious color.

June 6th, fourth day after admission, the hand showed unmistakable evidences of gangrene. The ulnar side of the wrist and hand, and the four outer fingers, were much swollen, and destitute of sensation. His appetite remained good, and he slept well.

June 9th, the date on which I first saw the wound and resumed charge of the surgery at the hospital, the hand from the wrist to the finger-tips was in a more or less advanced state of gangrene, with patches here and there where vitality appeared to remain. A large slough occupied the palmar surface of the hand, extending back into the carpal bones. The opening through which the bones had protruded had not closed, and the denuded ends of the radius and ulna could be seen. It seemed at first sight, that, notwithstanding the slight glimmer of life remaining in the thumb and index finger, the only safe and expeditious way to proceed would be to amputate the whole hand. From my success, however, with my preceding cases, in cutting while gangrene was spreading, I decided to try to save the thumb and first finger.

We operated, using ether, and found all the phalanges of the three outer fingers, with their metacarpal bones, in advanced necrosis. The carpal bones and the ends of the radius and ulna were also thoroughly dead, and soaked in a serous, foul-smelling liquid. Everything of a suspicious character was removed, but the index finger and thumb were spared. The process of disintegration here was so rapid and so thorough that those retained members must have shared very soon the same fate as the

parts removed. The wound was treated by keeping the arm in a splint made of zinc, hollowed out to support the parts from the tip of the thumb and finger to the elbow. Cleanliness and antiseptic dressings directed. The wound healed kindly, though the skin on the remaining members peeled off in the course of recovery. He left the hospital within a month after operation, with fair use of his thumb and index finger.

My fifth case I ask your attention to for a moment, because there was a feature in it peculiar to itself, and of very much importance.

A lad of seven years, playing on a coal car while in motion, fell to the ground, the wheels passing over the right lower limb obliquely, tearing the skin completely off from the knee to the ankle, and here crushing the bones through, leaving the foot hanging by the torn tendons only. When reached by the ambulance surgeon he had lost a large quantity of blood, and was in profound shock.

He was admitted into Harlem hospital on the 3d of September, this year,—in fact, since I commenced this paper. Nothing was done with the dreadfully mutilated limb till the following day, except to secure the vessels. At this time he had fairly recovered from the immediate collapse, but had a very weak pulse. The foot was separated from the leg by snipping off the tendons, with the leg again cleansed and bound up. Nothing farther was done for five days except to sustain him well with stimulants and nourishment.

It was thought now that with the bare ends of the tibia and fibula exposed, the superficial tissues of the limb in a state of slough up to the knee, and his condition fair, though yet with a trembling, feeble pulse, we might make him more comfortable and rid him of the offending member by amputating above the knee. We might have removed the limb lower down, but we had no integuments for flaps. The critical question to decide was when to amputate with reasonable safety, my own experience having been that very young children do not endure amputations well.

At this time the exposed tissues of the limb had commenced to granulate, and in this instance the line of demarcation was well defined, commencing in an oblique circular form just above the patella, and going around the entire limb. At the borders of this narrow chasm the differences in the position and consistence of the parts were most interesting to study. On the necrosed side the tissues had a gray, charred appearance, were withered and shrunken, and by evaporation of the aqueous elements the slough had become dry and tough.

On the other hand, the sound side of this ring looked remarkably healthy, and in striking contrast with the mortified tissues. The boy was very carefully anaesthetized with ether, administered sparingly. A flap was formed by detaching and turning back the skin at the healthy limit,

and removing but a very thin shaving from the border, with a view of securing primary union. The femur was divided about two and one half inches above the knee articulation. After removing the limb, the parts were sutured with cat-gut, drained, and put up in the usual dressings. Very little blood was lost, not more than a drachm. It was more than four hours before he regained consciousness. He remained very feeble, never really rallying from the operation, and died the following day, about thirty hours after reaching his bed.

The amputated limb was carefully examined, and found sound down to the protruding ends of the bones. I saw no object in trying to save it when it was entirely denuded of integuments, for skin-grafting, which forms at best but a sort of cicatricial tissue, is almost useless as a covering to a movble joint like the knee.

The child's life, I am confident, should have been saved. I committed a fatal error in cutting before the patient's recuperative powers were fully established; everything was to be gained by waiting, a month if necessary, and nothing lost. But it is always easy to be wise after a mistake is made. It taught me a valuable lesson, however, and I would warn my brethren, under similar circumstances, of the danger of operating while the vital processes are at a low ebb.

The features elicited by the report of the foregoing cases, to which I would respectfully call your attention, are the varieties of traumatic gangrene, its causes and treatment. In the beginning, we must divide moist gangrene into the spreading and non-spreading. In the latter, the limit of death is sharply and accurately defined by a dividing line in a very short time after violence is sustained, but it must be remembered that this line is no criterion as to the depth of mortification. In the former, the gangrene has a small beginning, and extends upward. We might, indeed, with good reason, include as another variety that interesting process, gangrene of bone, or necrosis as it is called, when the osseous tissue dies, without any impairment of neighboring textures, the only variety of this degenerative process in which the destroyed substance is restored.

The causes of gangrene are rather obscure in many instances. Pathology has done little to clear the way to a better understanding of this malady, and, after all, we have

to lean mainly on the teachings of others and our own experience for guidance in treatment. In some instances its development is unavoidable. We cannot always predict or estimate how extensive or destructive an injury is without waiting. No one can explain why a trivial hurt may in one man lead to most serious consequences, while in another the extent of mutilation is alarming, and yet the limb recovers quickly and perfectly, with little or no constitutional disturbance and no loss of function. This is the mystery yet unsolved, and which, it seems, time will never reveal.

Inflammation is the most active factor in the production of moist gangrene,—intense inflammation, and putrid or septic infection. In all these recorded cases there was active inflammation preceding mortification except in two. In one instance, where the toxic irritant was immediately applied, the limb succumbed with the diffusion of the poison, which seemed to multiply in its intensity with its progress.

The laceration or obliteration of a large blood-vessel contributes its share toward the destruction of a part by cutting off its nutrition partly or wholly, though that this alone, in a person of previously sound health, will lead to gangrene, I am inclined to doubt. We all know that there is hardly a single vessel in the body which may not be closed by the ligature without the peripheral parts being endangered. In our case of gangrene on the ulnar side of the hand, it would be hardly rational to presume that even if the entire ulnar artery were destroyed it should occasion mortification, as we know that the collateral circulation in the forearm is good, and, beside, there is the freest kind of anastomosis between the ramifications of the radial and ulnar in the superficial and deep palmar arches.

Injury to a nerve may be transmitted to a large trunk, and from thence by sympathy affect a large area. It is entirely reasonable to suppose that a nerve filament may undergo death, and then, in turn, all the parts supplied by the same common trunk share the same fate.

We may have gangrene of various extent, and sometimes its course is remarkably erratic and fickle, as when it destroys

the skin only without affecting the subjacent tissues, or when it destroys the latter and spares the former. Blocking of the blood-vessels will not explain this, so that we must look to deranged or interrupted nerve-supply to account for it. Excessive or improperly adjusted pressure, and neglect or ignorance of wound treatment, are no doubt largely responsible for gangrene.

The treatment of gangrene may be divided into preventive, conservative, and operative: with the latter I am particularly concerned. For prevention, use means which will subdue or prevent inflammation. The modern enthusiast on antiseptics would have us believe that antiseptics being vigorously applied, inflammation is impossible. If we unconditionally subscribe to this doctrine, then it would be idle to discuss other measures. But there are some skeptics among us who are not yet quite ready to throw aside remedies which have stood the test of centuries. Cleanliness, soothing applications, warm or cold according to the comfort they give, rest, good fresh air, with light wholesome diet, contribute towards a favorable issue. If inflammation, however, develop in spite of our efforts to control it, we may often crush its violence by free blood-letting in the vicinity of the swollen parts, either by free incision or by punctures, the bleeding to be encouraged by warm, moist applications.

In inflammation terminating in mortification, what are we to do?

When is interference with the knife justifiable?

Shall we do by art that which nature often very tediously or imperfectly performs?

Is it conceivable that the attendant will stand idly by and see a limb slowly but steadily perishing, the deadly process propagating itself upward toward the vitals?

Shall we amputate in spreading gangrene?

These are questions which may be forced on the practitioner at any time, for it must be borne in mind that an extensive mortification may arise from a simple wound under certain circumstances, which may involve the loss of a limb.

Among the great surgeons of the early part of the present century there was much difference of opinion about the propriety of amputating while gangrene was in a progressive state. Sir Astley Cooper gave the great weight of his authority to that side which advised delay till more or less detachment of the diseased from the living tissues was evident. On the other side were the world-renowned military surgeon, Baron Larrey, and Mr. Guthrie, of England, both of whom gave the most cogent and convincing reasons for immediate interference.

Larrey maintained "that in cases of mortification arising from external injuries, notwithstanding what writers may allege to the contrary, we should not hesitate about promptly performing an amputation, as soon as the necessity of doing the operation is decidedly established; that there is no reason to apprehend that the stump will be seized with gangrene; as in the spontaneous variety which has not ceased to spread because traumatic mortification, after having arisen from a local cause, is only propagated by absorption and a successive affection of the textures of parts, by continuity of vessels, and amputation, performed in a proper situation, arrests the progress and fatal consequences of the disorder."

We must be positively assured that a limb is actually mortified before we resort to the removal of a part. This can usually be easily determined by its condition, the entire absence of circulation, the discoloration and puffiness of the skin, and, above all, its icy coldness,—that state of the tissues in which Baron Dupuytren proved by experiment that the temperature, for some inexplicable reason, is lower than in the dead body.

The exact point to enter when we have decided to amputate, where to sever the parts so as to get rid of the defunct and spare the living, is, to the inexperienced, a difficult matter to decide. To the conscientious surgeon, as well as to the unfortunate patient, it is a most serious affair, as we all know of the inestimable value to the wage-earner, not only of a limb, but of every joint, no matter how small.

On theoretic grounds we should take no chances, but go well beyond the suspected parts. My experience, however, has taught me to be extremely conservative here, and include in the flap even some of the tainted part, rather than to go too far up into sound tissues, especially where a joint is involved.

In my case of mortification of the whole arm in consequence of external violence, which was successfully amputated at the shoulder-joint, the skin of the limb was greenish and livid, but high up the cuticle was not detached. The cellular substance was distended with air and a discolored sanies, and its appearance was not quite natural where the incision took place. It was yellowish and anasarcous; small effusions of blood were observed here and there, along the course of the nerves, even as high as the point of amputation. All the soft parts were discolored, dark red and livid, and a frothy reddish fluid issued on incision. As this case had a most favorable termination, it clearly proves that humid gangrene in the healthy subject, from severe local injury, which so rapidly affects a whole limb and reaches the trunk in a few hours, must constitute an exception to the older maxim, that "amputation must never be performed before the line of demarcation is well defined."

In drawing to a close I wish very briefly to epitomize the salient points which each individual case of mine presented.

The first, the swift and appalling virulence, and almost immedite lethal action of the bite of a rattlesnake.

In the second, though collateral circulation was established after the brachial artery was torn across, mortification quickly supervened, and was as promptly arrested by cutting through the affected tissues.

The third illustrates what a serious condition may arise from a trifling injury.

The fourth, that we should use every effort to save every inch of tissue that shows the slightest spark of life.

In the fifth, the failure to save life was due to haste in operating too early.

DISCUSSION ON PUERPERAL SEPTICAEMIA.

REMARKS INTRODUCTORY TO A DISCUSSION ON PUERPERAL SEPTICAEMIA.

By Carlton C. Frederick, M. D., of Erie County.

October 11, 1888.

Puerperal septicaemia has been discussed in late years by all of the prominent medical bodies of the world. Many thousands of pages of printed matter relative to it are to be found in the medical literature of the past two decades. The great advances made in the knowledge of its aetiology, prophylaxis, and treatment, no doubt, have been aided by this free discussion and interchange of opinion and experience; but all of its problems are not solved. It was therefore with the hope that a discussion of this subject at this time might shed some light, that it was brought before you.

Semmelweis, as early as 1847, gave to the world the first germs of truth concerning the causation of this dread disease. In 1860 he modified his former declaration by the statement that puerperal fever is originated by bringing decomposing animal matter, from whatever source, in contact with the wounded genitals during or after labor, the carriers being the hands of midwives, physicians, or nurses, soiled clothing, cloths, or sponges. Semmelweis died before his prophecy was fulfilled in the discovery of the microbe and a knowledge of its relations to decomposition and sepsis.

Since the microbe has been discovered in septic disease, isolated, cultivated, and inoculated, many heretofore inexplicable phenomena of disease have been elucidated. The number of laborers in this field of research has been great, and the amount of knowledge acquired concerning the relations of the microbe and disease is correspondingly large.

Are micro-organisms invariably found in the bodies of women sick with puerperal septicaemia?

It is impossible to quote at length the array of facts bearing upon this question. Micro-organisms have been found in the lochia; in the fluids of septic endometritis and metritis; in the pus of parametric abscesses, and abscesses of the uterine walls; in the fluids of the pleural and peritonaeal cavities; in the lymphatics everywhere, leading to all the serous cavities; in the muscular tissues; in the blood; in the pus of suppurative arthritis; in all of the parenchymatous organs, especially in the liver, spleen, and kidneys; in the brain and its ventricles; in thrombi, emboli, and infarctions wherever found. As authorities for these statements, we have to look to Mayerhofer, Feltz, Coze, Waldeyer, Rindfleisch, Orth, Heiburg, Klebs, Koch, Pasteur, Litten, Von Recklinghausen, Stearns, Fraenkel, Doléris, and many others, who have independently observed and described them. They are invariably found, and are always similar or identical in form.

Tiegel endeavored to prove that round bacteria are normally found in the internal organs. Koch states that he has often examined normal blood and tissues by such means as prevented any possible error, and that he has never, in a single instance, found bacteria or other organisms.

A fact which would seem to argue against the bacterial origin of septic diseases is, that bacteria are seldom found in the blood of the patient during life. Doléris, however, contends that they can be found if persistently sought for, and especially after a chill. They are constantly found in the liver, and in the capillaries and glomeruli of the kidneys, where they have been filtered from the blood. Hence the argument is not sustained.

It might also be argued that septicaemia is only a result of the absorption of fluids containing leucomaines or ptomaines. When a large quantity of putrid blood is injected directly into the circulation, the animal dies with all the symptoms of putrid intoxication. Its blood will not possess

infectious qualities immediately after death. That the poison is produced by bacteria, however, is proven by Gutman and by Koch. Gutman cultivated a drop of putrid blood in Cohn's fluid, thereby developing a poison in the fluid which, when separated from the bacteria it contained, and injected into the veins of dogs, caused death. Koch's experiments were even more conclusive. He injected enough putrid blood to cause death in from 4 to 8 hours. When so small an amount was injected that death did not ensue from putrid poisoning, the animal remained well for 24 hours or more, and then becoming ill, died in from 40 to 60 hours. An examination of the blood immediately after death showed the abundant presence of bacteria.

If putrid fluids not deprived of bacteria be injected subcutaneously, after a period of incubation, systemic infection will begin from the point of injection as a focus. Hence the power of multiplication of septic matter resides in the micro-organisms which it contains. If these fluids be deprived of micro-organisms by filtration, or destruction by heat, and injected subcutaneously, the only result is a local inflammation at the point of injection, and not systemic infection.

If pathogenic bacteria are invariably found in puerperal septicaemia, will they in turn produce septicaemia by inoculation? This has repeatedly been done upon the lower animals, by Doléris, Hausmann, Coze, Feltz, D'Espine, and many others, both with fluids from puerperal fever patients and with isolated and cultivated microbes. The inoculations have not been universally successful; but it must be remembered that among the lower animals there exist different degrees of susceptibility to septic poisons. The activity and virulence of micro-organisms vary with the number of cultures and the medium in which they are cultivated. This has been proven in experiments with antiseptics, the same strength of a special germicide acting in different degree upon the same bacteria under different conditions of culture. These facts partly account for the inability of experimenters

to isolate and definitely prove the exact lesions produced by each of the different varieties, as in the experiments of Doléris and Pasteur. It is upon the constant presence of bacteria in infected wounds, and in the fluids and tissues involved in pathological processes, that has been based the argument in favor of connecting puerperal septicaemia with micro-organisms.

Many eminent clinical teachers of obstetrics have strenuously insisted that puerperal fever is a zymotic disease, as is typhoid or any other essential fever. It is denied by them that fever, occurring in a puerperal woman, is puerperal fever, unless that fever be of a certain type. If a woman develop a fever from a decomposing and retained clot or piece of ovum, or has a metritis, perimetritis, or any other local inflammation with fever, it is not puerperal fever. For, it is maintained, puerperal fever has no characteristic lesions. If any local lesions do exist, they are not identical with the idiopathic inflammations of these organs, and are not sufficient to explain the cause of death, or to influence the course of the malady. There may be inflammation of any of the organs in which are found the lesions of puerperal fever, and yet the disease will not possess all the essentials of puerperal fever. It is said that puerperal fever is both contagious and infectious. It may be carried by a third person from one puerperal patient to another, and this they insist is not true with regard to the fever accompanying the simple puerperal inflammations, nor to puerperal septicaemia, which may be "manually transferable," but is not infectious or contagious. The epidemics of puerperal fever, not only in lying-in hospitals but in private practice among the best classes of society, and the many consecutive cases occurring in the practice of certain physicians, have been cited in proof of the infectious and contagious nature of the specific disease. Puerperal fever often develops a day or two before labor, or during labor, even when the child is subsequently born alive, but puerperal septicaemia never develops before or during labor except when the foetus is putrid. Puerperal fever is not

identical with puerperal septicaemia, as is demonstrated by the difference in the influence of the two diseases upon the infants of the mothers affected. Infants of mothers sick of puerperal fever frequently have erysipelas or trismus nascentium, both fatal in a large majority of cases. Dr. Barker insists that this never occurs when the mother has puerperal septicaemia.

Despite these various arguments in substantiation of the specific nature of puerperal septicaemia, the tendency of modern research has been to prove that the puerperal poison is of a septic nature, and the points of entrance to the body are generally through the wounds of the genital canal. It is, however, probable, from clinical experience, that the germs of the disease do gain admission to the blood through other channels,—the respiratory or digestive tracts. Otherwise it were impossible, in the epidemics of former years, to account for the development of the disease at the time of labor or before the beginning of labor. This, too, would serve to explain those cases occurring in non-pregnant women, nurses, and mid-wives, reported from the Paris hospitals.

It seems that only the most malignant cases of puerperal septicaemia were classed as puerperal fever, those in which malignant general infection led to a rapidly fatal termination. In this class of cases local inflammation had no time in which to develop. The doctrine of the localists, with whom puerperal fever was puerperal metritis, puerperal perimetritis, or puerperal *anything*, according to the most prominent local manifestations, did not take into consideration a blood poison which, together with the local inflammations, constituted puerperal fever. It was a very natural error, therefore, for another class of clinicians to take cognisance of the cases of blood-poisoning with rapidly fatal results and few local lesions, and call it *the* true specific puerperal fever.

As before stated, it is known that micro-organisms increase rapidly in virulence by repeated cultures in appropriate media, and especially if those media are the fluids of the body. The extreme malignancy, and the extremely infec-

tious and contagious nature, observed in the epidemics of puerperal septicaemia in the past seem to be explicable by this fact alone. That the circumstance of an obstetrician having had many consecutive cases of puerperal fever in his private practice should be an argument against the disease being a septicaemia, seems illogical. Before the days of efficient antiseptic precautions, no physician in attendance upon cases of puerperal septicaemia could possibly attend other cases of labor without transferring manually, as well as by many other ways, to the genitals of his patient, the germs of the disease. Verily, the light of recent knowledge makes clear many of the dark places of the past.

There occur, however, in the practice of nearly every physician, cases of puerperal febrile and inflammatory disturbances, which, probably, are not septic in origin, or, if septic in nature, they are very mild and transient. Some cases are caused from exposure to cold, from errors in diet, or from emotional disturbances. No doubt slight traumatic causes, such as are sustained in nearly all labors, may account for some cases. In considering the subject Dr. Lusk says,—"Probably the difficulty is best solved by assuming with Genzmer and Volkmann that there is such a thing as aseptic surgical fever due to the absorption of physiological tissue-changes at the seat of injury."

Puerperal septicaemia is similar to surgical fever, but, if we take into consideration that the physiological conditions of the puerperal woman differ from those of the surgical patient, and that the lesions and conditions of the genital canal are not analogous to the wounds that the surgeon treats, it is impossible that the clinical features of these two diseases could be identical, although the causes and means of infection may be the same. The most potent arguments in substantiation of this belief are to be found in the results of the practices based upon it. Epidemics of puerperal fever are among the experiences of the past.

There is abundant proof that the contagium of some of the zymotic diseases may produce in the puerperal woman a form

of febrile disease, indistinguishable from puerperal septicaemia, and presenting none of the characteristics of the specific disease from which the infection was derived. This opinion has been shared in and opposed by men of equal eminence. Drs. Lusk and Duncan found no relation in vital statistics between the frequency of death from puerperal septicaemia, and death from erysipelas, diphtheria, and scarlatina. The causative relations of erysipelas, diphtheria, and scarlatina to puerperal septicaemia have been more extensively observed than that of any other of the zymotic diseases. Trousseau, Playfair, and Lombe Atthill have reported puerperal septicaemia in hospitals directly referable to infection from erysipelas. In private practice Fordyce Barker, Minor of Cincinnati, and others have observed the same. Braxton Hicks reported 37 cases of puerperal septicaemia referable to the infection of scarlatina;—20 had the rash of scarlatina, and 17 could not be distinguished from ordinary cases of puerperal septicaemia.

The lesions of diphtheria have frequently been seen on the genitals of cases of puerperal septicaemia, both in hospital and private practice. These lesions are identical with those observed in the throats of patients suffering from diphtheria, and it is reasonable to infer that the entrance of the specific poison, by way of the genitals, may produce diphtheria of those organs with all the constitutional and local conditions of puerperal septicaemia.

Braxton Hicks, Playfair, Montrose A. Pallen, and others have reported the simultaneous occurrence of puerperal septicaemia with diphtheritic exudate upon the genitals and diphtheria of the throat in different persons in the same household. Dr. Lusk reports having seen a case of erysipelas start from a diphtheritic patch at the introitus vaginae and extend outward over the buttocks, thighs, and lower part of the abdomen. This is very suggestive of the relations existing between the specific causes of these two diseases. Recent experiments with the micro-organisms found in erysipelas by Doléris, Orth, Lukomski, Samuels, and others, shed still more light upon this relationship between erysipelas, diphtheria,

scarlatina, surgical and puerperal septicaemias. Subcutaneous injection of the fluids found in erysipelatous vesicles, and the fluid from puerperal septicaemia, produce the same local inflammations, and the micro-organisms developed Doléris describes as identical.

It is known that puerperal women are attacked by zymotic diseases which run their course without the manifestations of puerperal septicaemia. It would seem plausible that the explanation of the different manifestations of the effects of zymotic poison on puerperal women may be found in the different routes by which it gains admission to the blood. If absorbed by the abrasions of the genital canal, why may it not produce puerperal septicaemia? if by the respiratory digestive tracts, why may it not reproduce the disease from which it was derived? The modification of the zymotic poisons, when so absorbed and implanted upon the puerperal state, can only be accounted for by the blood changes incident to pregnancy, by the sensitive nervous system, and the effects of shock, haemorrhage, or tedious labor.

Statistics show that puerperal septicaemia occurs more frequently in primiparae than in pluriparae. In the light of present knowledge, from what ever stand-point it be viewed, the dangers of puerperal infection are in direct proportion to the number of channels laid open for absorption. The efforts of the accoucheur should therefore be directed to so conducting the various processes of labor that each labor may be as nearly physiological as possible, that is, to secure slow and complete dilatation of soft parts, thus lessening lacerations to the lowest physical possibility. If all labors could be conducted without the necessity of vaginal examinations, a large factor of danger would be removed. It is in proportion to the amount of manipulation required to be done, that the danger of infection increases. Allowing that all physicians properly disinfect their hands, which is doubtful, the avoidance of frequent examination is recommended. No consideration of the prophylaxis of puerperal septicaemia can be complete without the oft repeated injunctions concerning the proper

disinfection of hands and instruments before bringing them in contact with the genitals of the parturient woman. Equally important is the caution to be used about coming fresh from any septic disease, or from contact of any kind with septic material. The antiseptic vaginal douche should be given before examination. If the patient be delivered upon the side, she should be turned upon the back before delivering the placenta, thus preventing the rush of air into the vagina, which invariably occurs in Sims's position. The placenta is preferably delivered by expression, and firm uterine retraction secured, if necessary, by ergot. Again: Irrigate the vagina with a warm solution of corrosive sublimate, 1:3000, and examining the perinaeum, if any laceration exist close it by suture. The vulva and vicinity should then be thoroughly cleansed with a 1:3000 solution of corrosive sublimate, and the abdominal bandage applied. An antiseptic dressing of aseptic absorbent cotton and oakum is then applied to the vulva, and held in position by a napkin pinned before and behind to the abdominal band. If the placenta has been retained or adherent, and removed manually, or if the foetus be decomposed, the irrigation should be intra-uterine, of the strength of 1:4000. The antiseptic pad should be removed at stated intervals, according to the amount of lochia, the parts bathed with a 1:3000 solution of corrosive sublimate, and another dressing applied. The nurse should invariably disinfect her hands with the sublimate solution before removing the dressing. Burn the dressing removed at once. With this dressing vaginal injections are unnecessary. The patient should be raised to a sitting posture to defaecate and urinate, thus securing free drainage of the uterus and vagina. Give the patient an abundance of light, fresh air, and easily digested and nourishing food. My own observations have led me to believe that the rank and file of our own profession do not fully appreciate the scope of what is known as antiseptic midwifery. With many, simply rinsing the hands in a solution of carbolic acid or corrosive sublimate is the breadth and extent of antisepticism.

Why is it that puerperal septicaemia has constantly diminished in all the lying-in hospitals of the world, till now the poor unfortunate who seeks the care and protection which they afford is safer from the danger of puerperal infection than is her more fortunate sister who lives in her own home and has her family physician? It is because the obstetricians of these institutions have been driven by necessity to find a means of saving life, and constant research has rewarded their efforts. They employ these means of prevention at all times: hence their results. The general practitioner attending his private patient, in whose house has been no case of illness for months or years, who may or may not have a case of infectious disease under treatment, and who has only had an occasional isolated case of puerperal septicaemia in his practice, considers antiseptic midwifery as laid down in the books all well enough for hospitals, but thinks it all unnecessary in private practice. This is why the proportion of deaths among puerperal women in private practice is greater than that in the hospitals to-day. Although the refinements of antiseptic obstetrics have called forth, at times, the derision of certain unbelievers whose faith in nature in so physiological a process as labor is great, nevertheless the results are conclusive proof of its efficacy. Antiseptic surgery is universally accepted and practised. It has done no more, nor so much, to save human life, as has antiseptic midwifery. Then why should not antiseptic midwifery, in its fullest sense and most complete detail, be impressed upon the profession not only as a duty to the patient but a necessity?

If the conditions of puerperal infection were invariable, puerperal septicaemia ought always to pursue the same course. But the sources of infection and the points of inoculation being different, the local lesions and constitutional disturbances are necessarily variable, both as to character and intensity. Doléris found, by isolating the microbes of puerperal septicaemias, that the prevailing pathogenic organisms were of two kinds,—bacilli and micrococci, the latter occurring in single points, double points, or in chains or wreaths. He considers

round bacteria, especially the diplococcus, as the producers of pus, and the bacilli as the source of acute septicaemia. These may be found separately in puerperal septicaemia, but are generally associated. The course of the inflammations in the pelvic connective tissues is not by chance, but they advance in prearranged routes, as shown by Koenig and Schlesinger, and described by Lusk.

In those cases of puerperal septicaemia in which inflammatory lesions develop at all, clinicians observe that several lesions are usually associated, and frequently, one being more prominently developed, the others are masked. Hence an accurate differential diagnosis cannot be made in all cases.

The prognosis of puerperal septicaemia varies greatly with the character and intensity of the affection, as well as with the resistance of the patient. Another element in prognosis is the period at which treatment is begun, and the quality and efficiency of that treatment in the individual case. The purely septic types of the disease are the most uniformly and rapidly fatal, if not treated promptly. Septicaemia lymphatica and septicaemia venosa are both rapidly fatal, and are little amenable to treatment. The less the septicaemic element enters into the case, even though the inflammatory part of the disease be fully developed, the better the prognosis. Of course, local lesions, non-infecting at first, may later in the course of the disease become prolific sources of systemic infection.

A large proportion of the febrile attacks of puerperal women run a favorable course, and are almost certainly amenable to antiseptic treatment. As before stated, there are febrile attacks in puerperal women not due to infection. These need no treatment, and usually recover in from twenty-four to forty-eight hours. When septic germs have once gained entrance to the blood or lymphatics, they of course are beyond the reach of the physician; but it is to the prevention of farther infection that he must turn his attention. Except in cases of acute septicaemia, where the amount of septic matter absorbed at first is large and overwhelming, the

patient almost invariably rallies from the first shock of the poison; and if farther infection is prevented, we may anticipate her recovery.

To prevent farther infection, the indications are to destroy the germs at the points of production and of absorption. Where are these points? The lesions of continuity of the genital canal are situated at the entrance to the vagina, in the vaginal walls, and in the cervix, the only one in the cavity of the uterus being the placental site. It is rational, therefore, to assume that the point of production and the point of absorption in a majority of cases is not the uterine cavity.

Must the lochia be putrid and offensive to be infectious? The bacteria of putrefaction may exist in the lochia, and the septic microbe may not be there. Putrid lochia constitute probably a more fertile medium for the growth of septic germs, because septic micro-organisms are mostly anaerobic. The lochia may be excessively poisonous, however, without being putrid.

The indications for treatment, therefore, are to destroy the poison in the vagina by the intra-vaginal injection of a 1:2000 solution of corrosive sublimate given every three to six hours, the patient being directed to sit up after each injection to prevent retention of any of the fluid in contact with absorbing surfaces. Given with these precautions, so strong a solution is entirely devoid of danger of poisoning. If the fever be high, and do not fall after the first few injections, it is advisable to inspect the vagina for patches of necrosed tissue or puerperal ulcers. If found, these may be touched with what Dr. Lusk prefers, a mixture of equal parts of compound tincture of iodine and persulphate of iron, or with a twenty per cent. solution of chloride of zinc. In case there be found diphtheritic deposits, I prefer the fifty per cent. solution of chloride of zinc, as recommended by Garrigues.

It is probable that the uterus has been washed out too frequently in the past, and that the good results obtained from this procedure are referable to the disinfection of the vagina,

which necessarily occurs whenever we irrigate the uterus. If it were not for the dangers incurred, we might treat all cases in this manner; but there is a general consensus of opinion among those whose experience is the largest, that intra-uterine irrigation is not free from danger of shock, convulsions, carbolic acid or corrosive sublimate poisoning, and even sudden death. Another danger not to be forgotten is that of carrying to the normal uterine cavity the poisons from the vagina. The indications for the employment of intra-uterine irrigation are not always well marked.

If the case be one that has been subjected to manipulations within the uterine cavity during labor, or the foetus was dead, we are safe in giving an intra-uterine douche. If, after several intra-vaginal douches and inspection of the vagina for puerperal or diphtheritic ulcers, the fever continues high; if we suspect the retention of decomposing coagula, or parts of ovum, or membrane; or if the lochia continue putrid after disinfecting the vagina; or if the uterus be large and flabby,—then we should resort to intra-uterine irrigation.

If it be determined to irrigate the uterine cavity, place the woman in the lithotomy position before a good light, wash out the vagina, introduce a bivalve or trivalve speculum, and bring the cervix into view. The stream should be constant, as obtained from any form of gravity syringe, and the fluid should be a 1:4000 warm corrosive sublimate solution. The irrigator should not be held more than one to two feet above the level of the patient's pelvis, and free exit should be given the fluid by lifting the anterior lip of the cervix with the tube in the uterine cavity. All air should be expelled from the tube before it is introduced. After withdrawing the tube, all fluid should be removed from the uterine cavity by compressing the uterus from above. A twenty grain pencil of iodoform should then be passed into the uterus by means of a curved forceps. This treatment should be repeated every six to twelve hours, according to indications as shown in the temperature, and may be required for several days. In connection with the injections, ergot should be given to secure

firm contraction, thus assisting to shut the avenues of infection. Intra-uterine irrigation alone will not lower the temperature in those cases where diphtheritic pseudo-membrane exists upon the cervix or extends into the uterine cavity. After irrigation, these deposits should be touched with a fifty per cent. solution of chloride of zinc, and after a contact of two to three minutes the excess should be washed away. This is the only effective treatment the writer has ever seen, and the results have been satisfactory. A repetition of the application may be called for once daily for two or three days if the membrane spreads. This application destroys the membrane, and, if left long enough in contact with it, passes through to the mucous membrane, and seals all avenues of entrance to the tissues beneath. Some cases will not be benefited by intra-uterine irrigation, but, on the contrary, will be made worse by them. In such the treatment must not be persisted in.

The pain of peritonitis, or any of the inflammations associated with puerperal septicaemia, should be controlled by morphine. It has been recommended by Lawson Tait to do laparotomy for the cure of those cases of general peritonitis where recovery is delayed, or doubtful. The hygienic, dietetic, and medicinal treatment are the same as used in febrile diseases generally. As diarrhœa is a prominent and troublesome symptom in some stages of the disease, it should not be provoked by purgatives. If constipation exist, an enema once daily will suffice to move the bowels. If a high grade of temperature prevail, antipyrine, or, preferably, antifebrine, may be given to add to the patient's comfort and to preserve her strength. Continuous reduction of temperature by artificial means masks the efficacy of the local antiseptic treatment and the true condition of the patient. If antipyretics are given, it should only be occasionally.

The sequelae of puerperal septicaemia are numerous, as would naturally follow from the pelvic organs being involved in so many acute inflammatory processes. In short, there may exist, following these inflammations, all the errors of

circulation and defects of nutrition and involution, which characterize the various chronic ailments of the pelvic organs.

It has been impossible to consider any but the salient points in the discussion of this subject, which is so wide and involves so many side questions. I leave the elaboration of each topic to the separate discutors.

QUESTION I.

WHAT FACTS CAN BE CITED IN SUPPORT OF THE DOCTRINE THAT THE PUERPERAL FEBRILE DISEASES OWE THEIR ORIGIN TO THE ACTION OF MICRO-ORGANISMS?

Discussed by HERMANN M. BIGGS, M. D., of New York County.

It seems almost unnecessary at the present time to cite facts in support of the doctrine of the bacterial nature of the puerperal febrile diseases. These diseases are so manifestly infectious in nature, and have been so long and so generally recognised as such, that arguments are seemingly addressed to the proof of an already accepted and undisputed observation. The belief in their bacterial nature constitutes no longer a doctrine, but a well established fact. There are, however, some questions regarding the aetiology of these diseases and the manner of infection that are of great interest.

According to Bruner and Doléris, there are commonly present in the normal secretion of the vagina those microbes that bring about puerperal infection, so that all that is necessary to render this possible after childbirth is some solution in the continuity of the mucous membrane of the parturient canal. The danger in these cases of infection is rendered the greater because the lochial secretions afford an excellent medium for the growth of micro-organisms. As a matter of fact, after labor, wounds of the mucous membrane are always present, for, aside from any lacerations that may be made in the mucous membrane of the cervix or vagina, the interior of the uterus itself physiologically consists of a large wound-surface made up of innumerable minute wounds, constituting an admirable absorbing surface.

It would seem, then, a matter of surprise, not that puerperal fever should ever occur, but that it was not the rule after childbirth instead of the rare exception; for here are present in the vagina before labor septic organisms, and during labor the mucous membrane of the parturient canal is not only often lacerated, but physiologically there are apparently present in the uterus the most favorable conditions for infection. Nature, however, has provided for this contingency efficient safeguards, and it is only when there is a disturbance in their action that infection does occur.

In the first place, before any pathogenic organisms can bring about their specific effect under any conditions, the natural resistance of the tissues must be overcome. This resistance is ordinarily sufficient to prevent the entrance of septic organisms into the tissues unless they are present in large numbers and of a virulent form, or unless something has caused a diminution in the tissue-vitality.

Then, during the process of childbirth, the parturient canal is thoroughly washed out by the amniotic fluid and the secretions from its own mucous membrane; and the lochial discharges, *flowing away from* the uterus in abundance, carry off any organisms that may have remained in the vagina, or may have gained entrance to it. More than this, the abundant secretion and discharge constantly irrigate and protect the wounded surfaces, so that organisms cannot reach them or act upon them. Under cover of this, the uterus by its strong contraction closes by compression the minute wounds remaining in its surface after labor; and the epithelium, rapidly being generated, effectually seals over the whole of the interior with an impenetrable shield.

We know how quickly decomposition occurs in the lochia if there is any stagnation or interruption in the discharge, and how quickly a rise of temperature—meaning infection—follows, when from any cause the lochia become scanty. With any interruption in their flow, or any stagnation, decomposition, excepting in antiseptic midwifery, quickly takes place in the lochia; and as then the abraded surfaces are no longer

protected by the discharges, the micro-organisms soon reach the wounds and the process of infection begins.

If, then, anything interferes with the normal safeguards,—viz., if uterine contractions are wanting so that the wound-surfaces are not closed, if clots of blood or portions of placenta remain adherent to the interior of the uterus so that the regeneration of uterine epithelium is prevented at any point, or if the lochia are scanty or do not have a free outlet, and if the vital resistance of the tissues is reduced by prolonged labor, nervous shock, severe haemorrhage, or other depressing influences, and if with these conditions, microbes gain entrance to the uterus,—the most favorable opportunities for infection are present. The microbes may have been introduced into the uterus during labor by the hands or instruments of the accoucheur; they may have made their way up from the vagina from the lack of the lochial flow, or by an inflammatory process extending continuously; or, they may have been introduced through the air. Whatever be the method of entrance, infection will take place unless there is restoration to the normal condition of the physiological processes occurring in the uterus.

With this conception of the conditions existing in the puerperal woman, it is very easy to understand how the modern methods of antiseptic midwifery act in the prevention of infection. First, by the antiseptic douche during and after labor the vagina is thoroughly freed from all microbes. None are introduced during the manual or instrumental operations of the accoucheur; and after labor is completed, the antiseptic dressing prevents the entrance of organisms to the septic parturient canal;—so that now, even if there is some disturbance in the action of one or more of the factors normally present, infection is much less likely to occur; and there is an opportunity for restoration to the normal conditions before infection can occur.

The difference in the virulence and nature of the organisms which bring about infection, the resisting power of the individual, the condition of the uterus and surrounding parts,

and the site and nature of the wounds through which infection occurs, will explain the differences in the severity and nature of the disease produced. Such considerations as these can alone explain the Protean character of puerperal fever. When there are portions of retained placenta, blood-clots, or stagnating lochia in the uterus, it may happen that only organisms of decomposition gain entrance and produce putrefaction in these, the chemical products of which are absorbed, while the microbes themselves have no power of penetrating the living tissues. We have thus a putrid intoxication; but sooner or later septic or pyogenic organisms also gain admission to the uterus in these cases, and make their way into the blood or lymph currents.

The slight febrile disturbances that often occur in puerperal women are largely due to slight degrees of infections. In these cases there is some temporary disturbance in the normal adjustment of the natural guards for the prevention of infection, and a few germs gain admittance. If a continuous supply is wanting, these are soon cast off through the kidneys or other excreting glands, or are destroyed, and the symptoms produced by them disappear. That many of these cases are of this nature is shown by the temporary presence of pyogenic organisms in the urine and in the secretion of the mammary glands of such women. In my own observation the staphylococcus pyogenes aureus has been found in the milk of women suffering from such transient febrile disturbances for a short time, and then with the disappearance of the symptoms the germs also disappeared.

Regarding the organisms that have been found in the blood and tissues of women suffering from puerperal fever, as would be anticipated from the varied character of the clinical history and pathological lesions in the disease, it has been found that the organisms differ considerably in different cases and in different types of the disease. The organisms for the most part belong to the pyogenic class, or those capable of producing suppuration, and in a general way may be said to be identical with those found in the surgical infec-

tious diseases, such as suppuration, septicaemia, pyaemia, erysipelas, &c. The streptococcus pyogenes, which is closely allied to, if not identical with, Fehleisen's streptococcus of erysipelas, has been found in perhaps a larger number of cases than any other single microbe. Next to this come the staphylococcus pyogenes aureus and albus, which are the ordinary organisms of suppuration. Any of these microbes may occur alone or together. Not infrequently they are associated with some optional parasitic germ, such as the bacillus pyogenes, Nos. 1 and 2, of Rosenbach. In some instances the bacillus of malignant oedema has been the active cause of the disease, and in a few cases some other septic or pyogenic organisms have been present. The microbes may be found in the inflamed tissues of the uterus and surrounding parts, in any secondary processes that may be present in various parts of the body, and generally also in the spleen and in the heart's blood.

In conclusion, then, referring briefly more specifically to the evidence of the bacterial nature of the puerperal febrile disease, it may be said that we have a class of affections closely allied in every way to the surgical infectious diseases, possessing the same general aetiological conditions, similar anatomical and pathological characteristics, and presenting the same organisms. It has been incontestibly proven that the surgical infectious diseases are produced by these same organisms, and from experimental evidence we know that they can produce all of the lesions found in the puerperal fevers. The puerperal fevers occur only under conditions where there have been opportunities for infection, and if efficient means are taken to prevent the entrance of organisms, puerperal fever does not occur. The disappearance of puerperal fever from maternity hospitals since the introduction of antiseptic methods constitutes one of the most remarkable features in the historic development of bacteriology. There is abundant evidence to show that these diseases can be transmitted directly from one puerperal woman to another, which can only occur in an infectious disease; and, finally,

no explanation based on other grounds can account for the epidemiology, the aetiology, the clinical history, or the pathological anatomy of these diseases.

The conclusion cannot be avoided that these diseases are bacterial in nature.

QUESTION II.

IS THERE A SPECIFIC FEBRILE DISEASE PECULIAR TO THE PUERPERAL WOMAN? OR ARE THE VARIOUS FORMS OF PUERPERAL FEVER THE RESULT OF SEPTIC OR PUTRID INFECTION SIMILAR TO OR IDENTICAL WITH THAT FAMILIAR TO SURGEONS AS SEPTICAEMIA?

WHAT AETIOLOGICAL RELATIONS EXIST BETWEEN THE ZYMOTIC DISEASES AND SOME FORMS OF PUERPERAL FEBRILE DISEASES, AND IN WHAT MANNER ARE THE ZYMOTICS MODIFIED BY IMPLANTATION UPON THE PUERPERAL STATE?

Discussed by

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The first part of the question which I am to consider does not allow a categorical answer, for, granting the possibility of a puerperal fever, *sui generis*, there may still remain febrile diseases to which the puerperal woman is liable, or febrile diseases specially modified by the fact of occurrence at the parturient period, and of these different diseases some may be "similar to or identical with that familiar to surgeons as septicaemia," while others may not be so related.

With this indication of a division of the question, I will proceed to answer the first part of the query, viz., "Is there

a specific febrile disease peculiar to the parturient woman ?" and I shall at once give my own conclusion in the negative.

To maintain the affirmative of this question, it is necessary to show that there is some infective material to which the pregnant or parturient woman is alone susceptible, or that the progress of a class of these cases in the symptomatology, the duration, or the lesions, is marked by special features that do not occur in other persons, male or female, and this distinction must be other than belongs to the anatomical alterations incident to the parturient state.

The fact that a special susceptibility to the ravages of a certain infective agent exists does not constitute a basis for a distinct classification of certain cases due to that cause from others due to the same cause, for special individual susceptibility is a fact in relation to all infective diseases. "Black measles" and malignant scarlet-fever are not nosologically distinct from the ordinary forms of those diseases, but depend on a poison common to the milder forms of the maladies.

The fact that the progress of any disease is favorably or unfavorably modified by personal or environing circumstances or conditions does not call for distinctions in the major classification. So far there is no evidence to show a change in the essential nature of the contagion of measles, or that of erysipelas, because of the culture-field afforded by the woman in child-bed. The special poison retains its specificity unchanged by the incident and resultant malignant process so apt to destroy the patient.

It is only since the discovery of specific living organisms, or special chemical agents, as the causes of disease, that the specific character of certain diseases could be rationally affirmed, though the presence of certain symptomatic or morphological conditions in common had served as more or less useful means of classification.

With the development of the idea and the partial demonstration of the fact of a parasitic origin of many diseases came a pointed and special claim that puerperal fever was

the result of infection. This was formulated by Semmelweiss over thirty years ago in the proposition that the causation lay in the absorption of decomposing organic matter of animal origin. As to the source of the infection, he made two classes,—first, where the infective material developed within the patient's body; and, second, where it was introduced, ready formed, from without. Hence the terms auto-infection and hetero-infection, which have served as a shibboleth in these controversies, to the offence of those in the profession who have the slightest regard for system in word-structure.[1]

The fact that puerperal fever quite generally, even if not uniformly, has its origin in a contagium does not prove a constant, specific, or single causation.

Taking inflammation as an illustration, the evidence at present points strongly to the conclusion that inflammation depends quite generally on the introduction of an infectious agent. This is specially true when there is a production of pus in connection with the inflammatory process. But the infectious agent causing the production of pus is not single but multiple in its forms, so that as far as puerperal fever may be regarded as a local inflammation (and local inflammation is undoubtedly often an important factor), the idea of the unity of the diseases through one special agent of causation is untenable.

Many cases are not accompanied by the signs of local inflammation, and some cases are so peculiar in their progress as to render an explanation of the origin difficult or impossible. A case under my personal care showed febrile disturbance on the second day after delivery, progressed to a fatal issue at the end of a week, and during that time there was no cessation or unhealthy change in the lochia, there was no local pain aside from a headache, no appreciable morbid disturbance of the abdominal or pelvic organs, no albuminuria; in fact, there were no notable symptoms or signs aside from headache during the first part of the illness, and the severe pyrexia, with its associated and progressive exhaustion.

[1] They are hybrids of Latin and Greek.

The occasional occurrence of cases of this kind might at first thought seem to justify the idea of a specific character to some of the cases of puerperal fever, even if the great majority were due to heterogeneous infection; but I believe a careful consideration of the facts will fail to sustain such a conclusion. The fact that we cannot at once define and describe the infective process or agent does not imply that we should create a new or distinct class of diseases, for we are constantly meeting with similar morbid phenomena, due to different aetiological factors.

Take, as an instance, fever itself. The general idea at present is, that this process is due to the introduction of a living ferment into the animal organism, except in certain instances in which morbid states are present in certain parts of the nerve centres. But this belief is not true, for fever may exist without the probable intervention of micro-organisms, or disease of the brain or spinal cord.

Formerly I was puzzled by cases like the following:

A patient in excellent health, pregnant three or four months, has metrorrhagia; the flow is very free, and there is no probability of a continuance of gestation. Though uterine contractions exist, there is no dilatation of the external os uteri. She is at some distance from the attendant's house; a good many hours must intervene before he can with propriety undertake active interference, and more urgent duties demand his presence elsewhere. To pack the vagina with a tampon containing sufficient disinfecting material to destroy all germs there present will prevent exhausting and *disturbing* haemorrhage, and at the same time avoid septic contamination. This practice may be criticised from some standpoints, and I cannot pause to defend it or give details of technique; but I have repeatedly resorted to it as the less of two alternative evils, always without subsequent regret, but, on the contrary, with satisfaction to myself and to the patient, who was disturbed but little by the manipulations, and the contents of the uterus were generally found protruding from the cervical canal when on the following day the tampon

was removed. The puzzle, however, related to the fact that in some instances when the tampon was removed, the patient, though feeling fairly comfortable, with no pain or intellectual disturbance, nevertheless had fever, often as high as 103° F. The absolute freedom of the tampon and other contents of the vagina and uterus from evidence of fermentative or putrefactive changes gave a reasonable ground for doubt as to the fever being septic, particularly as it would promptly disappear on the removal of the tampon, ovum, and clots, without the use of antiseptic irrigations or other measures.

The occasional occurrence of instances of this nature in obstetric and other surgical work led to grave doubts in my mind as to the necessity for micro-organisms in the production of fever due to wounds. While not prepared to demonstrate the negative of the proposition that bacteria might exist, and even be operative in spite of the precautionary measures, still the thoroughness with which the antiseptic precautions were taken, the absence of the usual signs of septic changes, and the constant presence of active germicidal agents, seemed to preclude that explanation. Then, again, it seemed probable that the morbid condition known as milk-fever was not uniformly, though probably quite generally, due to micro-organisms.

The problem, however, becomes clearer when viewed in connection with the work done in recent years, in which a variety of agents have been demonstrated to be competent to produce fever, including the physiological ferments and the so called leucomaines.

The occurrence of aseptic fever in transfusion led to the discovery that fibrin-ferment and serum-globulin when injected would determine fever, and this gave a clue to the probable explanation of those cases of traumatic fever in which no septic changes took place, as in subcutaneous effusions of blood when no communication existed with the air and no inflammation occurred.

In this way I became convinced that while the majority of cases of pyrexia occurring during the post-partum period was

due to infection from without, there remained a certain, probably a small, percentage of cases in which the fever was the result of agents derived exclusively from the patient herself.

Since the infection due to micro-organisms is commonly associated with a notable inflammatory process at or near the point of entrance of the toxic agent, and since aseptic fevers are usually not associated with a profound disturbance of the intellectual faculties, or even pain,—still less inflammation,—these points may be considered in their differentiation. While aseptic fever is usually mild in its effects, still the fact that a high degree of fever can probably be induced by self-infection is presumptive evidence that some of the severe or even fatal cases may have such an origin. Even if it were so, it would not constitute a specific puerperal fever in any proper sense of the term, but would furnish an instance of empoisonment probably incident to other conditions beside child-bed.

The most recent notable discussion involving the question of a puerperal fever *sui generis* was that in the New York Academy of Medicine in the winter of 1883–'84. The only participant in that discussion who strongly defended the existence of such a disease was Dr. Fordyce Barker. While the answer of Dr. Thomas was in the main full and satisfactory, two statements made by Dr. Barker were allowed to go unchallenged. In the first he says,—"I here state my conviction, that in private practice, where there is no epidemic influence, twenty cases of local inflammation . . . will be met with where one will be found to be due to septic absorption." Here is a distinction without an essential difference, for the surgeons of to-day will generally (as would those of five years ago) agree that while it cannot be assumed that inflammation *never* occurs without infection of the part becoming inflamed, still the evidence is so strongly cumulative in that direction that it can now, and could then, have been affirmed that if local inflammation ever occurs aside from septic absorption or *continued* mechanical irritation, it is certainly a rare event.

In giving his description of puerperal fever *sui generis*, Dr. Barker says,—"The symptoms are frequently manifested a day or two before, or even during labor, even when the child is subsequently born alive." This statement as a characteristic of puerperal fever is certainly remarkable, for, allowing a reasonable latitude for difference in signification to be attached to the term, it must still be accepted that the conditions intended to be specified usually take their rise in the post-partum period.

What percentage of the cases generally classed by physicians as puerperal fever may have shown fever before or during labor I have no means of ascertaining, but that its occurrence before the completion of parturition must form the rare exception is manifest, I think, to all unbiased observers. This, of course, does not preclude the occurrence of ante-partum fever as a comparatively frequent event in epidemics where erysipelas, small-pox, or other infectious diseases are prevalent, wherein parturition has probably been excited by the disease which the pregnant woman had contracted. The fact that many infectious diseases will precipitate labor, and at the same time expose the patient to special hazard, has long been recognised. Where fever antedates labor, is it not more rational to assume that it is due to some one of the many causes of pyrexia to which the pregnant woman is exposed in common with others, than to claim, without any anatomical or clinical evidence, the existence of a distinct disease to which the pregnant and parturient woman alone is liable?

I may be dwelling longer on this division of my subject than its importance requires, but I will add one more quotation. It is taken from vol. 4 of the Cyclopaedia of Obstetrics and Gynaecology, where the American editor, Dr. Egbert H. Grandin, in a note reviewing the elaborated opinion of the author, Dr. Charpentier, that puerperal fever was always puerperal septicaemia, says,—"While septicaemia will be the disease in nine hundred and ninety-nine cases, in the thousandth the disease will be of zymotic origin." If this is the

final statement of the advocates of a puerperal fever *sui generis*, it may be considered as an abandonment of the claim for its distinct existence, for if nine hundred and ninety-nine are manifestly due to septic absorption, and only the thousandth remains with uncertain aetiology, under the doctrine of chances it would probably be an error to ascribe this thousandth case to other than some one of the causes determining the others.

In reviewing the evidence bearing on this portion of our subject, it may be said that at present the evidence shows that there will be no septic absorption without a wound or abrasion (with some exceptions, like the conjunctiva), and that an abrasion or wound without contamination by septic material will advance in the process of healing without symptoms other than belong to the solution of continuity; that septic absorption may determine only a local disease, or extend farther and produce a general infection usually attended by fever; that the puerperal patient may, and probably does, furnish specially favorable conditions for the development of septicaemia, but that the process is essentially the same as may occur in the non-pregnant woman or the male when infection occurs; that it has not been demonstrated that there is a special bacterium, or other poison, to which the pregnant or parturient woman is alone susceptible, and that such a special liability is improbable; and, finally, it is probable that a fever may arise without septic contamination, through the absorption of leucomaines or other material generated within the body of the patient; and that the presence of blood clots in the genital tract after delivery is specially favorable to this result.

None of these conditions, however, are entitled to be considered as the cause of specific disease peculiar to the pregnant or parturient woman, so that instead of our having a puerperal fever *sui generis*, we must consider puerperal septicaemia as a surgical septicaemia, and the essential fevers, as measles, scarlet-fever, small-pox, &c., as the same diseases, whether occurring in the pregnant or non-pregnant woman.

Therefore my answer to the first part of the question is, that there is no specific febrile disease peculiar to puerperal women; but that, on the other hand, while many of the various forms of puerperal fever are the result of septic infection equivalent to surgical septicaemia, there still remain certain cases due to common zymotic causes, and still other cases due to toxic agents generated within, or belonging to, the body of the patient.

The second clause of the question concerns the relation of the zymotic diseases to puerperal febrile conditions; and it may be be stated at the outset that pregnancy does not afford immunity from any one of the infectious diseases. This is at variance with former conclusions, particularly in reference to typhoid fever, but the fact is now fairly established, as I have stated.

The term zymotic disease may be properly restricted to its usual limits, *i. e.*, as signifying a disease presumably due to a contagium vivum, and usually propagated through the means of inspired air, drinking-water, or food. The list, as far as our present purpose is concerned, may embrace measles, scarlet-fever, small-pox, ague, cholera, typhoid fever, diphtheria, and erysipelas.

It is certain from common experience that each member of this group of diseases cannot stand in a frequent causative relationship to puerperal fever, particularly if we are to regard local pathological changes in the genital apparatus as a common event in that disease. We should endeavor to distinguish between the cases in which a zymotic disease may complicate a puerperal disease of other origin, and those in which the zymotic poison has been the cause of the puerperal disease. This is not always readily done, but the power of the suspected infection to produce local pelvic disease through contamination should have due weight in estimating its aetiological relationship.

Again: It is important to recognise that mere severity of the zymotic disease in the puerperium does not of necessity

imply an infection of or through the genital apparatus, and unless those organs be involved, or it can be shown that the infection has occurred through that channel, it does not seem proper to designate the attendant febrile disturbance as puerperal fever.

Of some of the zymotic diseases there can be no question as to a causative relationship in the production of pudendal or pelvic disease and an associated puerperal fever. It is not necessary to adduce evidence relative to the status of erysipelas in this connection, for I assume that no one will deny it.

I can recall one very severe case of puerperal fever associated with diphtheria of the vulva and vagina, the process having undoubtedly begun at abraded surfaces. This case I saw in consultation, and I concluded that the evidence favored the idea of diphtheritic infection, the physical signs being supplemented by a history of exposure to that infection. There were manifest signs of absorption of the poison in the pelvic lymphangitis and lymphadenitis, as that process exists and is so familiar in diphtheria of the pharynx.

The fact that Dr. Robert Barnes has found the seasonal curve of puerperal fever to nearly correspond with the curves of scarlet-fever, erysipelas, and other zymotic diseases, may be as fairly considered evidence that the conditions favorable to production of these maladies are in turn productive of puerperal fever, as to give the interpretation put upon it by Dr. Barnes.

In this period of greater care in the protection of our parturient patients, we should not forget medical history and its terrible records of hospitalism, and the evidence thereby furnished of a causative relation between erysipelas, etc., and the diseases of child-bed.

The relationship of measles is not so clear. Two instances of measles associated with the puerperal state have occurred under my knowledge. In one, the patient was feverish the day following confinement, and on the succeeding day presented all the clinical evidences of measles. She had a

moderate degree of pelvic inflammation, and died about the fifth day after her delivery.

The other case was under the care of Dr. C. E. Nichols, and the disease became manifest about one week after delivery, and progressed rapidly to a fatal issue without notable pelvic symptoms.

That the contagium of measles, without a general infection of the patient, is liable to develop puerperal fever without the coincident development of measles, seems to me to be still an open question, though no patient, even if protected by a previous attack, should be carelessly exposed to the poison.

On the other hand, scarlet-fever probably stands as a causative agency in the production of puerperal fever; but even where the contagium is introduced through the genital tract, local symptoms do not always follow.

An instance was related to me by Dr. J. B. Harvie, in which a woman in child-birth had no other exposure than through her medical attendant, who went direct, and without ablution, from the examination of the person and throat of a severe case of scarlet-fever to attend this lying-in woman. In about thirty-six hours after the delivery she had a chill, which was soon followed by the scarlatinal sore throat and rash. Though severely ill, she fortunately recovered, and there were no pelvic symptoms.

Small-pox undoubtedly can produce the local inflammations commonly associated with puerperal fever, but whether this occurs through the special poison of the disease, or through contamination with the products of pustular inflammation, is uncertain.

There is no evidence to show that the poison of typhoid fever, ague, or cholera has any influence in the production of that complex which is termed puerperal fever; at least it would be more rational to invoke the idea of some incidental contagion more specially potent in unfavorably influencing the progress of wounds; for in this influence on and through wounds, it seems to me, lies the true key to the pathology of puerperal septicaemia.

A few words in relation to the manner in which zymotic diseases are modified by implantation on the puerperal state will close my part of the discussion.

In general terms it may be said that the gravity of the disease is increased if it occurs to a patient in child-bed, but that the essential nature of the disease remains unchanged; *i. e.*, the infection of measles, small-pox, scarlet-fever, etc., received from and through the parturient woman, would reproduce its kind, as from any other patient.

It is not possible to define at present the special cause or causes for the increased mortality due to the association of some zymotic diseases with parturition, though where pelvic inflammation results or is associated a reason is manifest. The generally accepted statement, that the blood of the pregnant woman contains a smaller proportion of red discs and an increased proportion of fibrin, is somewhat significant, not only of a diminished capacity for resistance to the diseased processes, but that, in the increase of fibrin, materials may be at hand for the ready and easy development of injurious substances.

It is notable that in ague the attacks are arrested during labor, but in a few days thereafter the disease resumes its usual course.

The statistics in relation to cholera are not full enough for reliable conclusions, as the disease is so variable in its mortality; but the statement by Charpentier, that of 139 cases of the disease in pregnant women 55 died, would indicate that the fatality is not increased by pregnancy, for the average mortality is about 50 per cent.

Another statement by Hennig places the mortality at 48 per cent. in those who miscarry, and at 66 per cent. in those who do not miscarry, miscarriage occurring in 50 per cent. of the pregnant women ill with the disease. It is probable that the larger mortality with those who do not miscarry is due to a greater severity of the disease, which would in many instances terminate life before delivery could occur.

Small-pox is notorious for its great mortality among preg-

nant women. While varioloid, or the discrete form of the disease, allows a fair prospect of recovery, even if abortion supervenes, in the confluent variety the rule is that abortion will occur, to be followed by the death of the patient. The mortality of all cases of small-pox in pregnant women varies in different epidemics from 20 to 40 per cent.

The story told for small-pox may be repeated for scarlet-fever, the rule being an abortion, and the hazard of the patient being great.

The same statement will hold good in the case of measles complicating parturition.

In considering the influence of parturition on erysipelas, a careful distinction must be made between those cases occurring through infection of the genital tract, and those developing in the ordinary manner through access of the poison to the lymph channels of the nasal mucous membrane. While the most violent form of puerperal disease is liable to follow the former method of infection, it is probable that but moderate danger is incurred if the nasal form of development occurs and no mechanical transference of the contagium to the genital apparatus is made.

This was illustrated in a case under the care of Dr. C. E. Nichols, who found one of his patients with a facial erysipelas on the day after her confinement. Though he anticipated a fatal issue, he used careful precautions to avoid infection of the genital tract, and the patient progressed to a recovery from the erysipelas as though no complicating danger had existed.

DR. S. B. W. McLEOD.

If some of the ancient philosophers could attend the meetings of our modern medical associations, and hear us tracing our opinions from our own to their times, they would doubtless admire our discrimination. If they listened to our discussions of *neoplasmata*, *prophylaxis*, *thrombosis*, *therapeusis*, *sepsis*, and *zymosis*, they might naturally think that we had taken leave of our own language and selected our words from the ancient Greek and Latin tongues.

It is a saying of Mason Good that "the perfection of a science depends in no inconsiderable degree upon the perfection of its language, and the perfection of every language upon its simplicity and precision."

It is the teaching of advanced minds in all departments of science, that correctly chosen words are as necessary to revert back in the interest of correct ideas, as accurate thoughts are to select appropriate words for their expression. We claim *sepsis* and *zymosis* to be words whose use tends to give us correct ideas of the great pathological conditions they respectively represent. Confining our attention as closely as possible to the question now before us, my story of puerperal fever may be briefly told as follows:

Undoubtedly the older observers considered this malady to be a specific febrile disease, depending on one and the same cause. But viewing it in the light of new facts, in the description of the particular parts or organs involved, in the more careful notice of the rise and fall of temperature in the body and of the atmosphere, in the effects of remedies, and in relation to the germ theory and bacteriology, very few practitioners could now be found to regard its origin as always the same. Peritonitis, metritis, phlegmasia alba dolens, cellulitis, have each been considered as forms of puerperal fever. Thermometry, local and general, has contributed not a little to correct views of the nature of the disease by showing the different types and stages of the fever, and by indicating approaching danger or expected convalescence. The use of veratrum, opium, quinine, extreme cleanliness, and antisepsis, has given proofs of its true nature, and disproved incorrect ideas of its proper treatment.

Churchill, of London, has given a list of nine conditions to which the cause of puerperal fever was attributed. By him these were carefully tabulated; the names of the various authorities favoring each form were appended; sub-divisions of these were made; forty-five epidemics were described with a statement of the local affection prevailing in each. Churchill's descriptions have been, with certain modifications

and additions, followed by various authorities up to the present time. Some years ago, while in consultation at the bedside of a case of puerperal fever, one of the consultants, who had been a pupil and follower of Churchill, was asked to describe the views of that eminent obstetrician in regard to its pathology and the question of contagion. The writer of this paper well remembers how satisfactory and yet how defective were the statements made. In the chain of inferences there was a missing link. From our knowledge of bacteriology to-day the germ theory would have supplied that link, and the antiseptic treatment would have been the appropriate remedy. Looking over the tables of Churchill, to which we have referred, it is evident that symptoms then misunderstood would have been satisfactorily explained by the presence of bacteria and the accompanying sepsis. If, as the lawyers say, "we could rest our case just here," it would be proper to decide that the disease is identical with what is now known as *septicaemia.*

But I believe that there are cases which the septic theory fails to explain. Instance a sudden attack preceded by mental emotion produced by causes entirely exterior to the circumstances surrounding the patient. Consider the fact that a woman is sometimes attacked during an earlier period of gestation, or later on and just before labor has commenced, and of course before the parts are in condition to take on septic infection. The germs of scarlatina, typhoid, or erysipelas sometimes enter the system as *zymotic*, not *septic*, poisons, and symptoms of puerperal fever ensue. Cases illustrating these statements can be readily supplied. It is well known that a febrile paroxysm, from whatever cause, produces a most unfavorable influence on a wound, and it is not unlikely that a zymotic poison may enter the system and give rise to all the symptoms of puerperal fever.

Let us glance at the criterion of successful treatment. Almost every form of medication has been tried, with various advocates and still more varying success. We do not trespass on the domain of treatment, except thereby to show the

nature of the malady. Prof. Clark claimed for the opium treatment that in the use of this medicine almost every case recovered, while before its use almost every case died. This method he considered as only useful in certain special forms, and, looking to the future, he said that the malady might soon become a surgical rather than a medical disease. This corresponds with the teaching of abdominal surgery as practised now. It must also be borne in mind that from all along the line of observation there comes a voice in favor of the antiseptic treatment and its success. One author says that "antisepsis is now carried so far that diseases from infection shall not occur, but be placed in the category of historic maladies." Dr. Senn writes, as he quotes from Germany's greatest bacteriologist, that in consequence of the general use of antiseptics in that country there is no opportunity of studying septicaemia, because the disease is well-nigh banished.

The writer would therefore answer the first part of the question thus,—that puerperal fever is a complex disease due to many causes, but in most instances to surgical septicaemia. I believe that there is an aetiological relation between the zymotics and some forms of puerperal fever, and I incline to the belief that the relation is much like that existing between typhoid and malarial fever in the disease recognised by the International Medical Congress in Philadelphia as typho-malarial. Many authors acknowledge other causes as creating puerperal fever, but claim for sepsis about 98 per cent.—too high a proportion, I think. On this subject much must be left to the future to be determined.

Let us formulate thus:

1. It is wise to acknowledge the potency of septicaemia, and that it is the cause of the majority of cases of puerperal fever.

2. It is proper to acknowledge that while this is the case, other causes, then, are of a zymotic origin.

3. That practitioner is best qualified to treat the disease who never fails to use antisepsis, but also relies on quinia,

iodine, iron, alcohol, antipyretics, and opium to assist in diagnosis, and act upon conditions which sepsis does not explain.

DR. A. L. CARROLL.

[Read by title.]

In considering the predisposition of puerperal women to septicaemic infection, a few statistical data may be interesting, and these I have collated from the reports of our state board of health for the three years 1885, 1886, and 1887, including all the deaths ascribed to "puerperal diseases." Under this necessarily inexact heading, it is probable that other accidents attending the parturient act are comprised, but, on the other hand, cases which should properly be ranged in the category of post partum infection are occasionally reported simply as "peritonitis," "phlebitis," etc., with no indication of their puerperal origin, so that the recorded figures may warrant an approximate estimate of the frequency of fatal toxicaemia following childbirth.

MORTALITY FROM "PUERPERAL DISEASES" IN THE STATE OF NEW YORK.

	1885.	1886.	1887.	Total.
January,	93	96	72	261
February,	95	87	86	268
March,	118	106	103	327
April,	94	90	100	284
May,	94	73	71	238
June,	78	74	56	208
July,	107	56	90	253
August,	54	58	67	179
September,	59	61	45	165
October,	58	50	53	161
November,	63	70	67	200
December,	61	63	75	199
	974	884	885	2743

It is noticeable that the least mortality has occurred in the last five months of each year, from August to December,

inclusive, the death-rate rising in the first seven months, with a very marked augmentation in March, while the total mortality of the state, from all causes combined, is greatest in July and August. Turning to the zymotic diseases, we find that typhoid fever commits its greatest ravages between August and December; diarrhoeal disorders—the commonest indices of filth-fermentation—rage most disastrously from June to October; diphtheria, though with less partiality, shows a preference for the winter months. Two diseases, however, which have been supposed to have occasional connection with puerperal infection, exhibit a different seasonal relation: Scarlatina, with a rapid rise in its mortality during December, holds nearly equal sway until July, when it begins to decrease. Erysipelas displays in its curve a still closer similarity to that of the puerperal diseases, with the curious coincidence that its highest point is also reached in March.[1] For convenience of comparison, I have prepared a table of the deaths from these maladies, by months, during the three years in question:

	Typhoid.	Diarrhoea.	Diphtheria.	Scarlatina.	Erysipelas.
January, . . .	230	255	1395	366	93
February, . .	166	246	1272	324	113
March, . . .	207	813	1339	352	151
April, . . .	193	307	1185	382	138
May, . . .	137	401	1253	352	122
June, . . .	147	2032	1174	289	82
July, . . .	238	9348	1043	207	39
August, . . .	402	5361	869	155	46
September, . .	569	3034	1195	158	42
October, . . .	527	1114	1754	217	45
November, . .	432	398	1997	275	62
December, . .	315	278	2121	385	105

Of course such apparent correspondences do not logically imply a transmutation of the respective contagia, but merely

[1] The correspondence between these mortality-curves in England, though their seasonal incidence differs from that in New York, is illustrated by Dr. Robert Barnes (British Medical Journal), Nov. 12, 1887:

suggest that some common factors may favor the development of each of them. Erysipelas, in particular, may be regarded as usually indicative of insanitary domiciliary conditions.

Our registration of births is too notoriously defective for any purposes of argument, but, computing the birth-rate at 32 per 1,000 of the population (which is a low estimate), there were, in the three years, more than 536,000 confinements in this state. Out of these, as has been said, there were 2,743 deaths attributed to the puerperal predicament, or a maternal mortality of one half of one per cent. At first sight this may seen to be a small ratio, but it represents an aggregate of lost lives far greater than should attend a physiological process, and exposes little or no general advancement of obstetric art for half a century, despite the improvement of aseptic and antiseptic measures. In England, in the eight years 1847–'54, the puerperal death-rate, according to Farr, was 0.53 per cent., and for the thirty years ending 1876, 0.5 per cent. Le Fort, excluding hospital statistics, calculated it at 0.47 per cent. more than twenty years ago.[2] It is therefore evident that much remains to be learned of the aetiology of puerperal perils before certain means can be devised for their prevention.

[2] Since this paper was written Dr. Cullingworth has published (British Medical Journal, Oct. 6, 1888), the following synopsis of the registrar-general's returns of puerperal mortality in England and Wales:

Year.	Children born alive.	Deaths from Childbirth.	Mortality per 1,000.
1867	768,349	3,412 (puerperal fever, 1,066)	4.44
1868	786,858	3,503 (" " 1,096)	4.45
1869	773,381	3,283 (" " 1,181)	4.24
			Average, 4.37
1884	906,750	4,347 (" " 2,468)	4.79
1885	894,270	4,449 (" " 2,420)	4.98
1886	903,866	3,877 (" " 2,078)	4.29
			Average, 4.68

QUESTION III.

WHAT CONDITIONS OF THE WOMAN PREDISPOSE TO THE DEVELOPMENT OF PUERPERAL SEPTICAEMIA? TO WHAT EXTENT ARE THE ACCIDENTS OF CHILDBIRTH, TOGETHER WITH THE MANIPULATIONS OF THE ACCOUCHEUR, TO BE CONSIDERED AS AETIOLOGICAL FACTORS IN PUERPERAL INFECTION?

ARE THERE ANY ANTISEPTIC MEASURES BEFORE, AT, OR AFTER LABOR, UNDER ANY AND ALL CONDITIONS OR COMPLICATIONS, THAT MAY BE RELIED UPON AS PROPHYLACTIC TO PUERPERAL SEPTICAEMIA?

Discussed by

FRANK W. ROSS, M.D., of Chemung County.
JOHN SHRADY, M. D., of New York County.

DR. FRANK W. ROSS.

The causes of puerperal septicaemia may be briefly classified as the condition of the woman and her susceptibility to septic influences; outside conditions surrounding her, such as bad hygienic environments, improper care, food, and protection; foreign influences, conveyed by the attendant and others through the medium of hands, instruments, etc.

The condition of the woman which predisposes to inflammatory diseases during the lying-in period is of itself peculiar to the patient, and is of as much importance as any factor to be considered; *e. g.*, two men receive exactly the same injury—an injury to the knee-joint, for instance—in the same

situation anatomically, and by the same force. One has an inflammatory condition, simple and uncomplicated in character, with a complete and speedy recovery (the perfectly natural sequence to be expected from an injury of similar nature and extent); the other, regardless of similarity of injury and apparently perfect condition of health, has a violent inflammation of the soft parts, or perhaps caries or necrosis of bone. Under these circumstances, it is but reasonable to suppose that some constitutional vice, or condition of the patient, is the real cause, or an important factor, and is in itself of more moment than the injury received.

Thus, two women may be confined in the same or adjoining rooms, by the same attendant, under exactly the same conditions, *i. e.*, labor may be natural or instrumental, the women to all appearances in the same physical condition of health and of the same constitution and age, therefore with an equal chance for a speedy and complete recovery, having the same care and attention, and yet one has some form of puerperal fever, while the other completes an uneventful puerperium.

For these diametrically opposed results we must look to some cause from within, peculiar to the woman herself, which we may call a predisposition, or vice of constitution, or dyscrasia, if you please, for which no one is responsible, and against which, aside from placing the patient in the best possible condition of health and surroundings to resist the disease, we are almost powerless, and against which there is no known prophylaxis except a virtuous celibacy.

On the other hand, any known dyscrasia of the blood, or disease of any of the vital organs, or perversion of their functions, may become a prime factor of puerperal fever. The various infective, contagious, or communicable fevers, surgical and otherwise, diseases of the various organs (particularly of kidneys, lungs, or bowels), a previous peritonitis, a gonorrhoea, cystitis or pelvic cellulitis, deformities of the maternal parts, natural or acquired,—all are or may be potent factors, directly or indirectly aetiological. Against any and all of these conditions, "forewarned is forearmed," and as far as it

lies in our power we must correct the tendency they may have to destroy the lives of our patients.

The importance of these conditions is at once appreciable, and the mere mention of them will suggest to practical men appropriate and rational measures for prevention or cure, as may be indicated for each individual case.

The accidents of childbirth, due to the condition of the parts themselves, together with those induced by the accoucheur, are factors against which, all things being considered, we have the most potent means of prevention if we properly appreciate the condition at the time, and use the rational means of preventing puerperal infection from a known cause. Under this head we must include accidents of all kinds, avoidable and otherwise, from a slight rupture of the perinaeum to a ruptured uterus, post partum haemorrhage, retained placenta, etc. Of these, we must say to the accoucheur, be sure that you are not accountable for them, and when they do occur, take the most active and rational means to prevent their becoming a source of infection.

The bruising or laceration of the maternal soft parts by the child, or the same condition induced by hands or instruments, and the carrying of infection by manual or instrumental interference, require only to be mentioned to indicate their dangers. For my part I prefer an injury made quickly by myself as less dangerous than a contusion due to continued and prolonged pressure of the child's head against the maternal structures. A slight tear of the maternal parts, with careless exposure to septic influence, is by far a more dangerous source of infection than an extensive one, properly appreciated and treated with antiseptic precautions.

Are there any antiseptic measures before, at, or after labor, under any and all conditions or complications, that may be relied upon as prophylactic to puerperal septicaemia?

To this question as a whole I would answer most emphatically, No. In detail, as far as any human agency is infallible, Yes.

The means of preventing puerperal fever are as numerous as the causes and various types noted. Each will require a specific treatment or prophylaxis. We cannot generalise, or make iron-bound and inflexible rules for the treatment and prevention of this disease in its various manifestations and phases, any more than we can in the various fevers, or different types of the same fever, where the symptoms may be wholly unlike and require almost diametrically opposed treatment. No one with pretentions to a scientific knowledge of medicine would treat all cases of diarrhoea after a set rule, or with a pet remedy, regardless of the pathology or cause: such a course would be equally illogical and unscientific in puerperal fever.

I do believe, however, that general rules may be made, the carrying out of which, in particular and in detail, with proper regard for the cause and merits of the case, will prevent or lessen the mortality which we now have, as well as the number of cases of puerperal fever.

In judging of the result of any measures employed we must have due regard for the condition of the patient, her surroundings and health, giving due credit to climatic, epidemic, and endemic influences, which we may not be able to explain but know to exist. For example: In one year, without apparent cause, pneumonia is very fatal; in another, it is uniformly mild;—the beginning of the epidemic is more apt to be severe than the last few cases. Again: Certain seasons are more productive of fevers and epidemics. Some of these facts we can explain, others we cannot. Considering all these, I believe the following general rules may be relied upon as safe guides for the prophylaxis and care of the lying-in woman as regards puerperal fever.

1. As to the woman herself and the general surroundings: See to the proper functions of all the organs of the body,—that she has proper food, air, exercise, and hygienic surroundings. In short, place her in as near perfect health as possible, both general and local.

2. As *you* approach the lying-in chamber, see that all

things are cleanly, and that pure air is plentiful. Everything which touches her body in any way—her clothing, the bed, your hands or instruments—must be clean; carbolise, bichloridise, make antiseptic, make clean in any way you choose, but do it thoroughly; be consistent. If you use an antiseptic solution, use it of such sufficient strength that you would have confidence in its antiseptic virtues were the parts to be placed in your own abdominal cavity. Do not be content with a few drops of carbolic acid in a large quantity of water, as a sort of "voudoo" against infected germs;—they cannot be frightened by bluster or noise; they will find the weak parts in your armor, and assail through them. Hence the unwarranted attacks against antiseptic measures by those who do not appreciate their value, or who use them improperly, either in strength or in mode of application. The fault is in the mode or methods of the user, not in the grand truths of Listerism, which is a thorough system of *cleanliness*, nothing more or less. Dr. Biggs will tell you that a drop of carbolic acid in a pint of water will not sterilise it, nor prevent the growth of germs, but a sufficient quantity will destroy, or at least render them inert.

In these days of *clean surgery*, no matter what theories you may entertain with regard to the cause of this fever,—whether you believe it infectious, communicable, or *sui generis*,—for the honor of scientific medicine treat such cases on the same general principles which you would employ in surgery, or in other departments of our art. Even if you do not believe that the disease can be carried from erysipelas, pyaemia, or the dead-house, or from one case of puerperal fever to another, for the sake of science and the duty you owe your patient and mankind do not go from such cases, or from a post mortem, to the lying-in chamber; do not, for any pet theory, take the risk of infecting a woman who places herself in your hands at this most critical period of her existence, who trusts you implicitly in all things pertaining to her welfare, even to her life. For what is your own favorite theory, no matter how correct it may be, to the value of a woman's

life and health? You may disregard all the known scientific facts a hundred times successfully, and then have a failure which I declare to be a crime, no matter how high you may rank in authority or in the esteem of our profession. The man who disregards the light of the present in the matter of puerperal infection, and who practises or teaches contrary to such light, is a monster worse than the Whitechapel murderer.

Treat your cases of puerperal septicaemia by giving due regard to the cause, both in prevention and cure. If it is due to retained decidua, remove this in the most rational, easy, and safe method, or render inert the decomposing mass which surely is in the best possible condition to be absorbed into the blood and so infect the system. If you have a laceration of the soft parts, good surgery tells you either to close it or to render it antiseptic. If in your judgment the case requires antiseptic solutions before, at, or after labor, as prophylactic or curative, use them in a rational manner, with some definite idea in view.

In the prevention or treatment of puerperal septicaemia, forget yourself; do the best for your patient that circumstances will permit. It is painfully evident that the best cannot always be done, but whatever you do, do well. No pet theories to the exclusion of known and acknowledged scientific facts; no hypocrisy, no pitting of a life against a theory. No one remedy or treatment can prevent or cure this hydra-headed monster. Let your prophylaxis and treatment be on general principles; let them be the application of known scientific remedies or appliances to known pathological conditions, and you will have no cause to blush for your rate of mortality from puerperal septicaemia.

DR. JOHN SHRADY.

What conditions of the woman predispose to the development of puerperal septicaemia?

The conditions concerning which the question has been so pertinently put are indeed not very obvious, but in general

it may be stated that a lowered vital tone is one. The acceptance of the microbic view of the cause of this disease would at least presuppose it, inasmuch as healthy tissue acts as the first great barrier to its progress. A general breaking down by the onset of diseases such as are classed under the head of typhoid, or the virulent exanthems, may contribute very largely to the catastrophe. Owing, perhaps, to the supplementary character of the foetal circulation, with the concomitant of exaltation of function on the part of the mother, there seems to be peculiar susceptibility to morbific causes. There is in these cases an activity with a tendency peculiarly lethal, as is demonstrated in the usual issue of puerperal scarlatina. But this, however, is to be accepted as the grosser and more palpable form of a mode of termination, because there the progress more directly appeals to the eye.

Exposure to an epidemic may be responsible for the lengthening of the chain of victims. This was long known, and isolation was employed as a prophylactic measure very early in the stage of its study, when the obstetrician was appalled by the Nemesis which followed him from one lying-in chamber to another. This, however, is to be regarded as an epidemic influence propagated by an individual medium, with perhaps the collaterals of unsanitary surroundings and other depressing influences. Erysipelas, typhus, and surgical septicaemia have all been credited with being originators of the disease by hospital or domicile association. Over-crowded tenements, insufficient nutrition, and even scanty wardrobes may contribute their quota to the undesirable statistics by preparing the soil for the inimical microbe.

To what extent are the accidents of childbirth, or the manipulations of the accoucheur, to be considered as aetiological factors in puerperal infection?

At the outset it may as well be assumed that the primary lesion of the generative tract must be the starting-point of the trouble, or, in other words, that it is through this channel

that the septic microbe must enter. But why say assumption, when experiments by culture and propagation in the lower animals point the same moral? It is scarcely fair, in assigning a traumatic beginning to any of these deplorable catastrophes, that we should consider mere insignificant tears when the separation of the placenta itself constitutes a wound of no mean dimensions. Here is at once a condition of absorptivity, with patulous vessels to receive and carry onward any morbific agent. Here, too, is an ideal nest for coddling, for nurture, and for multiplication. By a process of negative reasoning the conclusion is inevitable that the subjects of the most tedious labors and prolonged operations have their compensation in classical recoveries. It is usually to them who have caused the least anxiety that the most unexpected disaster happens; it is to them that the doom comes with a pitiless celerity.

With reference to manipulations, it may be held that the growing practice, and that too by common consent, is now to refrain from too frequent examinations. Experience seems to have taught that much expedition is not to be expected in the first stage of labor, so that the natural forces have a better opportunity of accomplishing their work in their own way. Nor, indeed, are patients as clamorous for such attentions as were accorded them of yore; nay, some discourage them, probably because they have become more philosophical, or because the physicians themselves, with increase of years, have entered through the portals of a higher understanding by the way of a wider experience. To the intelligent patients, indeed, unless there be present an all-absorbing enthusiasm, with increase of knowledge there comes increase of doubt; they have verily learned that our art has its limits as well as all others.

But manipulation of itself can in no sense be made a scapegoat, since if that were of itself a cause, catastrophes would be more common and responsibilities more fearful. Nor should the sequelae of manipulations be made entirely chargeable with the septic crime; in a medico-legal aspect,

indeed, it would be a woful wresting of evidence. In the consideration of this subject, diphtheritic inflammation is to be left out of the question, since that appears to be endemic in European hospitals more than in those of this country. It seems, however, to be only a disease superadded to a recent lesion on the external surfaces, and not likely to penetrate into the organism.

Then, too, the distinction between purulent infection and putrid infection is to be steadily borne in mind. The former is more common, the latter more virulent; the former more insidious, the latter more overwhelming. Before 1872, up to which time the microbe was unsuspected, there was very little distinction made between a blood infection and an anatomical lesion; there was a crude and altogether too wholesale classification, which conjointly made the issues so terrible. Now statisticians in a measure diminish the mortality by contracting the classes.

May it not be said that no one cause is responsible for this, the crowning horror, but that several influences are workers in union? May it not be an organisation in which many allies take their several parts? It may be that the attendant is a rude manipulator, by no means antiseptically pure; but what in the past has kept the census-taker in countenance with his uniform laws of increase? What did become of the female of the olden time, with the midwife crone of uncleanly habits, who ministered between feather-beds,—the heir-looms of centuries? What of the female who lay for days amid dirty linen and putrid clots? It is desirable only to answer that there must have been many escapes. It is not necessary to extenuate or to apologize for an age which had its horror of a breath of air and kept the cup of water away from the parched lips; and yet families were large, and many hearths warmed even four generations beneath their roofs?

These questions are best answered by another inquiry: Why were there not more deaths? It is impossible to cite cases in support of any theory, because there are too many politic concealments. In all candor, it can hardly be said

that either wounds or manipulations are the moving causes of death. They may be contributors, it is true, but most likely to a very limited degree. It is well, indeed, to avoid all appearances of evil by avoiding all possible solutions of continuity, but unjust indeed would it be to deny the benefit of so grave a doubt.

Are there any antiseptic measures before, at, or after labor, under any and all conditions or complications, that may be relied upon as prophylactic to puerperal septicaemia?

In the consideration of this topic of prophylaxis and therapy, it is hardly necessary to raise moot points of the unity or variety of the cocci. It is not important to inquire whether or not some of them, like the tape-worm, pass through the most different stages of existence, or occupy the most different abodes. Nor would it be profitable to pass upon the vicissitudes in careers as the cause of dissimilar diseases. Let it be taken for granted that the common mission is death; that the more powerful destroy the weaker; that the multiplication is rapid and enormous; that difference of form may be due to variations in nutriment; that culture increases virulence in progressive degrees; that some animals and some individuals of the same class are more susceptible to the malign influences than others; and, above all, that some may be innocuous of themselves, but still victorious by reason of numbers.

It has been said in effect by some one, that cutting off the food-supply is the essence of all prophylaxis. Let this reasonable statement be adopted. Take, as an example, the familiar pest, the Colorado potato-beetle, which maintained a precarious existence in the mountains, feeding upon the *Solanum rostratum*, a kind of wild potato; but how soon an ever-increasing horde fell upon the potato patches of civilisation, and marched to the east at the rate of fifty miles a year! Here a valuable food product was involved, and, as in the human female, arose the problem how to destroy the one and

preserve the other. And yet let there not be too much haste in conclusions; let not the lurker beneath the window-sill always be regarded as a burglar: his presence does not of itself presuppose a crime. Now, in this whole affair of microbes there happen to be many missing links of evidence. Their existence cannot be gainsaid, but their function cannot bear the test of any and every explanation. Perhaps there are other occult causes at work, even as in the marvellous and fascinating mystery of life itself. Perhaps the reign of these very atoms may be intended to be beneficent; perhaps, as has been more than once said, they may be only scavengers.

Again: May not irrigation wash away the soil, whether the fluid be but water of ordinary purity, or loaded down with disinfectants. Lister himself, it is said, begins to be less elaborate in his preparations, as if even his logic was beginning to be shaken. These doubts, however, are not claimed to be insuperable: it would not be well for man to be without faith, for it is the music which stimulates him on to effort. Certainly there can be no harm to preach that "cleanliness is next to godliness;" no specious reasoning is necessary to prove that many things are accomplished where others were intended. Still there need be no inveighing against present usages; there still may be just as much fondling of prophylactics, just as much shutting out of unseen enemies as need be; and savage tribes, with all undesirable animals, will still increase. There is a contribution to the general fund, but is its significance entirely known? A temple has been built, but is it founded upon a rock?

Now, whether the changes in the blood be due to chemical or biological causes; whether the fluid be corrupted, or whether there be simply an error loci of foreign elements,—there still remains the grave doubt as to the possibility of purifying the one or dislodging the other. All that justly can be expected is, as far as possible, to put the system upon the defensive, and placate the innate sense of right by the use of recommended measures. These last are many, various,

and duly listed. They probably ought to be employed, in order that it may be said that for the benefit of the patient nothing has been omitted. When this has been said, it is quite enough: there can be no impugnment of deeds, even though absolute faith in remedies be absent.

QUESTION IV.

ARE THE LESIONS RESULTING FROM PUERPERAL INFECTION ALWAYS THE SAME? IF VARIOUS LESIONS RESULT, CAN AN ACCURATE DIFFERENTIAL DIAGNOSIS BE MADE BETWEEN THEM, BASED ALONE UPON THE HISTORY AND SYMPTOMS?

Discussed by William H. Robb, M. D., Montgomery County.

In answering the first part of this query, I would say that many and distant organs are affected in puerperal septicaemia, and consequently the lesions resulting from septic infection are not always the same. To verify the correctness of this assertion, one has but to refer to the carefully recorded post-mortem examinations made by Lusk, Parvin, and Barker, in cases where death was caused by septic poisoning. From a study of these records we find that nearly every organ in the body has been found diseased as the result of septic infection. If, then, we admit that various lesions result from septic poisoning, we should naturally inquire which organs are those most frequently involved in this disease? The uterus, peritonaeum, cellular tissue around the womb, uterine veins and lymphatics, are very frequently diseased: less frequently are the Fallopian tubes, ovaries, vagina, and vulva affected.

We may differentiate between these lesions in many cases. Occasionally it is difficult, and sometimes it is impossible, to do so. In a few cases the vitality of the patient is so rapidly destroyed by the poisonous influence of the septic matter that death occurs before any reactive change has occurred. No lesion is found after death unless some obscure blood-change. The anatomical structures of the same and of different organs are so closely connected that disease affecting one

almost always involves the other. Symptoms indicating disease in one organ are necessarily modified by the presence of disease in neighboring organs.

One can therefore see how difficult it may be, and sometimes is, to differentiate between the lesions of puerperal septicaemia in an individual case when the uterus, peritonaeum, and pelvi-cellular tissue are at the same time inflamed. The degree or extent of injury done to the different organs may vary. If one organ is more deeply diseased than its neighbor, its condition is denoted by symptoms that predominate in the clinical history. Lesions being found more frequently in the womb than in other pelvic organs, I will describe, first, the symptoms that indicate their presence in this organ. The symptoms of endometritis and metritis are so similar, that for practical purposes, and to save repetition, I will describe them together, and only refer later to those that would differentially indicate the presence of one or the other. If, during normal convalescence, on the second, third, or fourth day after delivery, the woman becomes restless and wakeful, and begins to suffer from headache and pain across the lower part of her abdomen, and, if a multipara, complains of frequent and protracted after-pains, with lessened and slightly offensive lochia, we begin to suspect puerperal trouble. If, after suffering these symptoms more or less severely for a few hours, she is seized with a rigor lasting from a few seconds to fifteen minutes or more, followed by fever, with a temperature rising to 100° or 102° F., and a pulse numbering from 80 to 100 per minute; if these last symptoms persist and are followed by increased tenderness over the region of the womb, and this organ by palpation is found to be large and flabby, and by touch to be restricted in motion, with a soft and patulous os from which oozes foetid lochia,—we may, with great certainty, say that this woman is suffering from endometritis. If, now, we could modify this patient's condition so as to represent her in every way the same as described, excepting that the uterus has become more tender, more firmly contracted, dense, and more restricted in motion, we

should say she is suffering from puerperal metritis. The clinical history of pelvic peritonitis in the parturient woman is very like the histories already given. In this affection, however, the initiatory chill is more marked; it continues longer, and is followed by fever that marks a higher elevation of temperature, the thermometer reaching 103° or 104° F. The pulse is quickened slightly, and often numbers 110 to 120. The pain is more intense, sharp, and lancinating, and in this affection nausea and vomiting, with tympanitic distension of the abdomen, occur.

Many of the symptoms already enumerated are present in pelvic cellulitis, the result of septic poisoning. Vesical and rectal irritation are frequently present in this disease, and furnish characteristic symptoms. In addition to these, we find by touch thick and hardened masses deposited irregularly around the uterus, and varying much in size and location in different women. These deposits are sometimes so large that they force the pelvic organs more or less from their normal position, and fix them as immovably as if they had become petrified. General peritonitis, I believe, always begins with a severe chill, lasting for half an hour or longer. The accompanying fever runs very high, the thermometer marking from 104° to 108° F. The pulse is very quick, numbering from 120 to 160 per minute; in character it is small, firm, and resisting. The pain in the beginning of the attack is extreme, and the tenderness so great that the patient cannot bear even the weight of the bedclothes to rest upon the abdomen. The least motion of the patient increases her suffering. The pain begins in one or the other groin, and rapidly extends over the whole abdomen. Nausea and vomiting are frequent and persistent symptoms in peritonitis. The abdomen becomes enormously distended, and there is frequently rigidity of the abdominal muscles, so that one gets by palpation a sensation of hardness almost approaching that of woody structures. To prevent suffering, the woman usually lies on her back with her knees drawn up; her breathing is entirely thoracic, and, owing to the distended

condition of the abdomen, is more frequent than it is in the preceding diseases.

Disease of the lymphatics in child-bed occurs soon after labor, and is preceded by lesions in either the vulva or vagina. These lesions may consist in either ulcerative changes or diphtheritic deposits. A severe chill always announces the beginning of puerperal lymphangitis. High fever follows the chill, and great distention of the abdomen occurs soon after. Disease of the serous membranes often follows, as the result of this affection, and later the joints may be, and often are, involved.

Phlebitis follows either an attack of endometritis or pelvic cellulitis. The seizure begins with a severe and protracted chill, followed by high fever. The pulse is quick, and varies with the degree of body heat. Tenderness can often be detected along the course of the veins leading from the uterus. If the affection extends to the limbs, the one diseased becomes swollen, but not discolored. The diseased vein can often be felt as a round and knotted wire. The disease may involve one or both of the lower extremities; and in one case that I saw the veins in both arms were hard and knotted, and at the same time the left leg was similarly diseased.

Repeated and irregular chills are said to denote the lodgement of emboli in distant internal organs. I have purposely omitted any allusion to disease of the Fallopian tubes and ovaries, as I believe it is impossible to diagnose their condition in acute puerperal septicaemia.

QUESTION V.

WHAT IS THE PATHOLOGY OF EACH OF THE SEVERAL FORMS OF PUERPERAL SEPTICAEMIA? WHAT CONDITIONS OR CIRCUMSTANCES INCIDENT TO PUERPERAL SEPTICAEMIA, AND WHAT FORMS OF THE DISEASE, TEND TO RENDER IT FATAL?

Discussed by FRANK GRAUER, M. D., of New York County.

As the lesions of puerperal septicaemia are so various, and as there are certain pathological changes that occur or predominate in one case and not in another, it would seem advisable to describe the changes that have been found in all cases of this disease, rather than attempt to give the lesions that occur in certain forms of this disorder. Before considering the pathological changes, I will briefly refer to some of the theories that have been advanced by different authors as regards the nature of puerperal septicaemia. The first,—the local theory, if I may speak of it as such,—which was advocated by Beau, Piorry, Velpeau, and others, in Europe, and sustained by the late Professors Meigs of Philadelphia and Alonzo Clark of New York, was that puerperal septicaemia was essentially a local inflammation, producing secondary constitutional effects, and that the source of the disease was attributable to whatever lesions were found at the autopsy. This theory was strongly opposed by Barker, who stated the following argument against it: First, that puerperal fever has no characteristic lesions. Second, that the lesions which do exist are often not sufficient to influence the progress of the disease, or to explain the cause of death. Third, that there may be inflammations, even to an intense degree, of any

of the organs in which the principal lesions of puerperal fever are found, and yet the disease will lack some of the essential characteristics of puerperal fever. Fourth, that the lesions are essentially different from spontaneous or idiopathic inflammation of the tissues where these lesions are found. Fifth, that puerperal fever is often communicable from one patient to another through the medium of a third party, and that this is not the fact in regard to simple inflammation in puerperal women.

In 1850 the late Sir James Y. Simpson published a paper in which he tried to prove the analogy between puerperal and surgical fever. To quote his words,—" A comparison of these two tables will serve to show you how far we are justified in speaking of surgical and puerperal fever as analogous in their nature; and the difference in the frequency with which different internal organs and parts are apt to become the seat of the acute inflammatory effusions and changes in the two sets of cases is owing mainly, if not, indeed, altogether, to the difference in the seat of the primary lesion." I might state that the tables referred to were taken from Rokitansky's record of autopsies at the great hospital in Vienna, and showed the relative frequency with which different organs and parts of the body were affected in the two diseases.

Robert Barnes, in discussing the question as to the absolute identity of puerperal fever and so called surgical fever, thus expresses himself: " That there are many points of analogy is undoubted; but there are also points of difference which forbid us to accept the doctrine of identity. The subject of an amputation, and a woman after labor, both present wounds. Both may be considered as susceptible to invasion by poison. In both the poison may effect a lodgement on the wounds. But it is easy to carry the comparison too far. Amputation is presumably performed on account of disease. The condition of the patient is pathological to start with. There is no special provision in the system made for the express purpose of healing the wound. The wounds in the

puerpera are physiological. There is a distinct provision *ad hoc* for restoration to the ordinary state. It is in this provision, marked by extraordinary activity of absorption and excretion, that lies the peculiarity of the puerperal state. This condition has no parallel in the ordinary surgical patient. If we are asked, What is puerperal fever? may it not be asked in return, What is surgical fever? Is surgical fever one uniform definite pathological entity? In neither case is the fever one constant thing. There are varieties of surgical fever even as there are varieties of puerperal fever. If it be contended that by surgical fever is meant septicaemia and nothing else, this is simply begging the question. We must still ask, What is septicaemia? And, again, if surgeons are prepared to give a precise definition of septicaemia in surgical cases, are they also prepared to show that septicaemia of the same character is produced in lying-in women? Septicaemia is a compound term. There is the sepsis—the poison; there is the blood which receives the poison. Now, if it be possible to show that the sepsis in the two subjects is identical, it would still be necessary to show identity, or near similarity, in the recipient blood. The first term of the proposition is certainly not proved. The second is certainly not true. This theory, then, like that of the microbes, is too absolute and exclusive. It may account for a large number, perhaps the greater number, of cases in lying-in hospitals; but it does not account for cases beginning before there is a wound, nor for the propagation to non-puerperal women."

In 1860 Semmelweiss promulgated the following theory: That puerperal fever was due to the absorption of decomposed animal matter, which produced, first, alterations in the blood, and, secondly, exudations. He distinguished two classes of cases. First, those cases in which the poison was generated in the system from products of decomposition in the individual herself. Second, those cases in which the infection was introduced from some external source. The sources from which the infection was derived were,—First, from dead bodies in a state of decomposition, regardless of age

or sex. Second, from patients suffering from a disease that is accompanied by decomposition of organic animal matter. Third, from any organic tissue that is in a state of decomposition.

Another theory, the great exponent of which is Dr. Fordyce Barker, is, that it is an essential zymotic fever, peculiar to and attacking only puerperal women, in which the pathological lesions observed after death bear the same relation to puerperal septicaemia as does the intestinal ulceration to typhoid fever. The fever is supposed to spread by contagion and infection, and to prevail epidemically both in private and in hospital practice.

The more recent or modern view held by obstetricians and pathologists upon the nature of puerperal septicaemia is, that it is to be regarded as an infectious disease, due to a septic poison that is introduced into the body through lesions of the parturient canal. As to the nature of the poison,—whether it is due simply to certain chemical poisons, namely, ptomaines, and what relation bacteria bear to the same,—this has, I believe, already been fully discussed.

The main channels through which the septic material is absorbed, are as follows: First, through lacerations about the perinaeum and fourchette, especially in primiparae. Second, through lacerations of the vagina. Third, through lacerations and abrasions about the cervix. Fourth, in the uterus at the placental site, through the lymphatics and blood-vessels, especially the veins, when, from defective contractions, the venous sinuses are abnormally patulous and not occluded by thrombi. Fifth, certain authors go as far as to claim that even wounds and abrasions are not indispensable for infection, and that it may occur through the respiratory and digestive tracts.

In reference to the sources of the trouble, they may be divided into two classes. First, cases of autogenetic infection, in which the patient infects herself. Second, cases of heterogenetic infection, in which the septic material is conveyed from without and brought in contact with the surface

of the generative tract. Under the head of autogenetic infection, we have,—First, retained portions of the membranes or of the placenta that have decomposed from access of the air. Second, decomposing matter from a putrid foetus. And, third, decomposition of the tissues of the mother due to continuous pressure during labor, or decomposition brought about by some previous morbid state of the generative tract, as in carcinoma, etc. Under the head of heterogenetic infection,—First, from zymotic diseases, such as scarlatina, diphtheria, erysipelas, typhus fever, etc. Second, from any decomposing organic matter. Third, cases in which the poison of puerperal septicaemia is carried from one patient to another.

In considering the pathological changes that occur in puerperal septicaemia, I shall follow, somewhat, the classification of Spiegelberg, which is as follows:

I. Inflammation of the generative mucous membrane.

II. Inflammation of the uterine parenchyma and of the subserous and pelvic cellular tissue.

III. Inflammation of the peritonaeum covering the uterus and its appendages.

IV. Phlebitis, uterine and para-uterine, with formation of thrombi emboli, and pyaemia.

V. Pure septicaemia.

We have two forms of inflammation of the vagina,—the superficial catarrhal form, and the diphtheritic. In the former we find that the mucous membrane of the vagina is hyperaemic and swollen, the papillae are somewhat enlarged, and the mucous membrane is covered by a profuse discharge. In the diphtheritic form we have ulceration of the mucous membrane. The ulcers are situated mainly at the posterior commissure; their edges are red and jagged; the base is covered with a dirty yellowish deposit. The discharge, as a rule, is very foetid, and alkaline in reaction. In certain cases the ulceration has a great tendency to spread, having at times a gangrenous appearance, and, associated with it, oedematous swelling of the surrounding parts. The small wounds at the

orifice of the vagina are often transformed into ulcers with tumefied margins, and are spoken of by the German writers as puerperal ulcers.

When the inflammation extends from the vagina to the uterus, it produces an endometritis, which may also be of a catarrhal or diphtheritic nature. In the catarrhal form we have the mucous membrane swollen, and an increased transudation of serum and pus in the uterine cavity. In the diphtheritic form we have rounded ulcers, with the intervening tissues greatly swollen, and in severe cases the entire mucous membrane may become gangrenous. The inflammation may extend to the tubes, and give rise to a salpingitis, or, passing through the fimbriated extremity, produce a peritonitis. In diphtheritic endometritis, and occasionally in the catarrhal form, we find the parenchyma of the uterus involved, constituting a metritis. The uterus in this condition is soft, flabby, and oedematous. The muscular tissue itself is rarely affected. It is only in cases of diphtheritic endometritis that the gangrenous process may destroy a certain amount of muscular tissue, producing a condition spoken of as putrescence of the uterus, which in rare cases may lead to perforation. It is in the intermuscular tissue that the inflammatory changes are found, which consist of a sero-purulent infiltration, especially marked beneath the peritonaeal covering, either behind or at the side, where the broad ligaments are attached. Often at these points the peritonaeum is lifted up by lymphatics that are filled with pus, and present a varicose and beaded appearance. The inflammation may spread between the folds of the broad ligaments, and thence pass up to the iliac fossa, and, after crossing the linea pectinea, it may take a forward direction, passing above the sheath of the psoas muscle to Poupart's ligament, or it may pass upward toward the region of the kidneys. In rare cases it may pass between the walls of the bladder and the uterus, and along the round ligament to the inguinal canal.

Parametritis, or pelvic cellulitis, is an inflammation of the loose areolar connective tissue that immediately surrounds the

uterus. The character of the inflammation is similar to that which occurs in areolar inflammation in other parts of the body. We have an acute inflammatory oedema, with an exudation, consisting of serum and pus, in the meshes of the connective tissue, and the consequent formation of appreciable swellings. These swellings may be situated in any part of the pelvis. Occasionally the exudation is so extensive as firmly to surround and imbed the uterus. In diphtheritic parametritis we have collections of pus scattered through the tissues associated with lymphangitis.

Perimetritis, or pelvic peritonitis, is an inflammation that is limited to that portion of the peritonaeum which invests the pelvic viscera, and is due to an inflammation that has passed through the Fallopian tube from an endometritis, or to an extension from an associated parametritis. The extent varies as regards the intensity of the disease. In some cases we have but very little exudation, while in others we find the pelvic viscera closely adherent to each other.

Diffuse peritonitis may be due either to an extension from a pelvic peritonitis, or to a transmission of the poison through the lymphatics into the peritonaeum. In the first form, which is spoken of by Bauer as metroperitonitis, we find that the peritonaeum is reddened and congested, the intestines are somewhat matted together, and the peritonaeal cavity filled with a fibrinous or a fibrino-purulent exudation. In the second form, which is often spoken of as peritonitis lymphatica, we find the abdominal cavity filled with a fluid of a stinking, discolored, or even haemorrhagic character, containing a large number of bacteria. The pelvic organs are sometimes actually covered up by a mass of exudation. The walls of the intestines are oedematous, and the intestines themselves are often distended with gas. In some cases the effusion may be fibrino-purulent, small in amount, and at the same time with matting together of the intestines. In rare cases, where we have a large amount of pus in the peritonaeal cavity, it has either perforated through the abdominal walls or through the diaphragm.

The first phenomenon that occurs in the veins of the uterus after delivery is the formation of thrombi. These thrombi become organised, and the occluded vessel becomes converted into a connective-tissue cord, or a channel may form through it which prevents the passage of the blood. If the blood contains infectious germs the thrombi degenerate, small particles are carried off in the circulation, which produce emboli in different parts of the body, with subsequent formation of abscesses. The parts mostly affected are the lungs, kidneys, spleen, liver, and muscles. As the result of suppuration we have an inflammation of the walls of the vein, or phlebitis, which may go still farther and produce a periphlebitis.

The lesions in the lymphatics are also produced by a penetration of infectious germs. Those mostly involved are the lymphatics of the uterus. These vessels inflame, and the inflammation spreading may produce a cellulitis, or a peritonitis, or a pleuritis, etc. According to Doléris, the inflammation of the lymphatics is the first factor, and the inflammation spreads to the blood-vessels by means of the thoracic duct oftener than by any other channel; so that it may appear at distant points, owing to the connection of the serous network with the capillaries.

The secondary lesions that occur in puerperal septicaemia are so numerous that the writer will simply mention without describing them: Pleurisy, the different forms of pulmonary abscess, and infarction of the lung; ulcerative endocarditis, with myocarditis; pericarditis, meningitis, and inflammation of the joints and muscles. The changes in the liver, kidney, and spleen are generally those of a cloudy swelling, with fatty degeneration. In the pyaemic foci abscesses are formed due to emboli.

With reference to a fatal prognosis, more depends upon the individual and the amount of infection than upon the extent of inflammation in the generative tract. Thus we have cases of puerperal septicaemia in which death takes place before changes have occurred in the sexual organs. At the autopsy we find that the blood is dark-colored and not coag-

ulated. The liver, spleen, and kidneys have undergone a parenchymatous degeneration. We may have ecchymoses and inflammation of the serous membranes. The description, as you will see, corresponds with changes that occur in cases of ordinary septicaemia.

Cases in which we have extensive diphtheritic inflammation of the uterus and surrounding parts generally terminate fatally. Cases of diffuse general peritonitis with extensive suppuration, and those in which the pyaemic processes are well marked, such as abscesses, suppuration in joints and muscles, as a rule end fatally. In rare cases sudden death is produced by thrombi in the heart and pulmonary vessels. The description is short, but I think it covers most of the ground in which cases end fatally.

QUESTION VI.

WHAT PLAN OF ANTISEPTIC TREATMENT CAN BE EMPLOYED WITH A LARGE DEGREE OF SUCCESS IN EACH OF THE SEVERAL FORMS OF THE DISEASE?

DOES EVERY RISE OF TEMPERATURE ABOVE 100 IN THE PUERPERAL WOMAN CONSTITUTE AN INDICATION FOR IMMEDIATE RESORT TO IRRIGATION?

WHEN SHOULD IRRIGATION BE INTRA-VAGINAL, AND WHEN INTRA-UTERINE? WHEN IRRIGATION IS EMPLOYED, HOW OFTEN SHOULD IT BE DONE, AND WHEN SHOULD IT BE DISCONTINUED?

WHAT HYGIENIC, MEDICINAL, AND DIETETIC TREATMENT IS TO BE USED IN ADDITION TO THE LOCAL ANTISEPTIC MEASURES? TO WHAT EXTENT SHOULD ALCOHOLIC STIMULANTS AND ANTIPYRETICS BE USED?

Discussed by

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DR. W. T. LUSK.

In the midwifery of the future there is reason to believe that the questions referred to me for consideration will have lost their importance. Indeed, it is my present belief that septic infection need never follow upon a properly conducted labor. A dozen years ago puerperal fever was still the curse

of lying-in institutions. When the lying-in service was transferred from Bellevue Hospital to Blackwell's Island, it became necessary to provide accommodations for patients requiring assistance in labor at hours of the day or night when no means were available for their conveyance to the island charity. At first, special arrangements for their reception were made by the Commissioners of Charities and Correction in private institutions in various parts of the city. Soon an outcry was raised that the unfortunate women belonged to a neglected class, whose presence in private hospitals endangered the health of the other inmates. Boards of trustees agreed to refuse to admit them, as a matter of self-protection. Under these circumstances the Emergency Hospital was opened. The hospital contains six beds. The number of confinements varies between 150 and 180 annually. At first the mortality from septic diseases was from 2 to 2.3 per cent. Since the introduction of proper methods of prophylaxis and Garrigues' vulvar pad, septic diseases are unknown.

The question is well worth consideration why a poor, unfriended, homeless woman, confined in a public hospital, should enjoy an immunity from infection which the very discussion this evening shows has not yet become the privilege of the well-to-do classes. It seems fair to infer that the methodical employment of reasonable prophylaxis has not yet become universal in private practice. I cannot but regard the stress laid in earlier teachings upon such cumbrous non-essentials as the taking up of carpets, the removal of curtains and furniture, and the scrubbing of the floor and walls with carbolic solutions, as largely responsible for much of this presumed remissness. Fortunately, more extended experience has proven that an efficacious prophylaxis against infection can be obtained by the adoption of a few simple measures, which inflict nothing burdensome upon either the physician, the patient, or her *entourage*.

In the first place, both nurse and physician ought to understand the requirements of surgical cleanliness. The same fastidious attention to the dress and the cleansing of the

hands and forearms observed by those who practice laparotomy should be employed by all who undertake the care of women in labor. Soap and water, a nail-brush, a solution of corrosive sublimate (1:1000) for the hands, and a 5 per cent. solution of carbolic acid for the disinfection of instruments, if required, will guard against contagion from without. Soap and water and corrosive sublimate solution should be employed to cleanse the vulva, the thighs, and the lower abdomen of the patients. As the vagina furnishes a congenial habitat for many coccus forms, an injection of a corrosive sublimate solution (1:1000) during labor is a safeguard against self-infection. In normal labors unnecessary examinations should be avoided, and devices to hasten the dilatation of the cervix by digital manipulations should be sparingly resorted to. In the third stage of labor it is necessary to secure the complete removal of the membranes. Just here great haste becomes a fertile source of after trouble. I always uncover my patients, and insist upon a strong light to enable me to control the placental delivery. If instrumental delivery has been necessary, or the hand has been introduced within the uterus, an intra-uterine douche of carbolic acid (5 per cent.) is an additional means of safety. Leopold recommends the immediate closure by suture of severe cervical lacerations. The technique is not difficult.

Patients treated in this way do not have puerperal fever. It is, however, proper to say that the measures indicated do not protect the lying-in woman from typhoid, and typhoid in the puerpera is not always easy to distinguish from septic infection.

Admitting the bacterial origin of puerperal fever, the object and aim of treatment necessarily become primarily the prevention of germs from invading the tissues and vessels, or, where this has already taken place, the employment of measures designed to so fortify the system as to enable the individual to resist the effects of bacterial activity.

Many internal remedies have been proposed which should have the effect when taken up into the blood to weaken or

destroy the streptococci of septicaemia, or to drive them from the body by the eliminant vessels of the kidneys or intestines. So far none of them have remotely fulfilled the promises made on their behalf.

In the fulfilment of the first indication, viz., the prevention of germs from entering the tissues to a deleterious extent, nothing at the first blush would seem more reasonable and appropriate than thorough irrigation of the entire utero-vaginal canal with a strong antiseptic solution the moment a rising temperature gives the warning that the advance of the skirmish line has already begun. Some even go so far as to direct the intra-uterine douche, repeated at short intervals, whenever the body heat exceeds 100°. Such a practice is based upon ignorance of certain elementary experiences. It is not devoid of risk, for wherever it has been tested upon a large scale in maternity hospitals, it has been followed by an increased mortality rate. It leaves out of account the essential mildness of the bulk of puerperal inflammatory affections. The great proportion of these consist of cases of ordinary catarrhal endometritis, of perimetritis, and of parametritis, local affections where the activity of the microbes is limited to the mucous surfaces, or where the resistance of the tissues invaded is sufficient to circumscribe their power for mischief. In all these cases the prognosis is favorable. If the uterine douche be employed at four-hour intervals, the death-rate will be considerable.

The indications for intra-uterine irrigation are not furnished by temperature tests. The occasions for its employment are a large, flabby uterus with retained coagula, a foetid discharge due to retention of portions of the ovum, and fevers following prolonged operations within the uterine cavity, or the birth of a dead foetus. The effects of the thorough cleansing of the uterine cavity in such cases is often immediate and most beneficent. The disinfecting stream should be carried into the uterus by a bent glass tube, and should always be preceded by a vaginal douche. The stream should be continued and not intermittent. Carbolic acid is to be preferred

to corrosive sublimate. Great pains should be taken to secure the free exit of the injected fluid. The quantity employed need not exceed two quarts. After irrigation is completed pressure upon the fundas through the abdominal walls should be exerted to prevent stagnation of the fluid within the uterine cavity. It is my custom after the douche to pass with the aid of Sims's speculum a bacillus containing a drachm and a half of iodoform into the uterus. This dissolves slowly, and is very efficient in maintaining disinfection. Frequent intra-uterine douches are not to be recommended. They serve to paralyse the uterine muscle, and in the end lead to the formation of dirty puddles in the fundus of the anteflexed uterus. There is a suspicion, too, that, where often repeated, the fluid is sometimes forced into the Fallopian tubes. When the iodoform bacillus is used, a second douche may be necessary at the end of twelve hours. A third douche is rarely if ever of advantage. The douche is only serviceable in cleansing the mucous surface. It does not affect the vitality of microbes which have already penetrated into the tissues.

But while decrying indiscriminate uterine irrigation, I still employ and have faith in the value of the vaginal douche in all forms of puerperal fever. I believe that it stimulates uterine contractions, and that by removing decomposing secretions which tend to settle in the vaginal cul-de-sac, it promotes the healing of cervical and vaginal wounds. If given with ordinary care it is devoid of danger, and is usually agreeable to the patient.

In every case of fever a careful examination of the vulva, the vagina, and the cervix should be made for puerperal ulcers. These, if present, should be touched with a mixture containing equal parts of Monsel's solution and compound tincture of iodine.

At the beginning of nearly all puerperal affections ice-bags over the uterus and in the line of Poupart's ligaments contribute to the localisation of inflammatory processes.

If local therapeusis proves unavailing, and microbes with

their poisonous products have already invaded the system, the chief aim of treatment should consist in increasing the resistance of the organism until the materies morbi is eliminated. The chief danger to be avoided is the weakening of the heart's action, the consequences of which are lowered arterial tension, venous stasis, and hindered absorption. Food ceases to be assimilated, and in the abdominal cavity a serous transudation takes place, in which disease germs thrive and multiply. When the circulation is feeble, pathogenic germs increase in numbers in the blood and destroy the blood corpuscles, and when conveyed to the tissues they cause local death and lead to pus-formation. The physician is a powerless spectator: death is inevitable.

The chief agents for sustaining the heart's action are alcohol, food, digitalis, strophanthus, and the removal of depressing symptoms. Of these, pain should be combated by opium, and fever by antipyretics. In milder cases I employ alcohol, liquid food, quinine, spraying, and ice-bags; in the more serious forms, antipyretics and the rubber coil. In all cases food and alcohol are indispensable.

Lately Runge has employed tepid baths with success in the severest cases of lymphatic septicaemia, the most fatal of puerperal diseases. Alcohol in large doses he gives at the same time to combat heart failure. The results he claims are to secure sleep, and to promote the ingestion of food.

DR. ROLLIN L. BANTA.

About ten years ago it was my misfortune to have in my practice a series of puerperal fever cases. Notwithstanding the strictest antiseptic precautions (the value of the mercuric compounds as germicides was not known at that time), one case followed another, not consecutively, but skipping over sometimes two or three only to reappear in a fourth or fifth In desperation, I had my arm done up for a pretended Colles fracture, in order to have an excuse for giving up my obstetrical while retaining my general practice. After the lapse

of four weeks, another effort was made to attend a confinement, with the result of having two fresh cases on my hands. Of course nothing now remained but to stop practice entirely. I accordingly did so, and resumed again at the expiration of six weeks, with good success.

Since that time puerperal septicaemia, in its various forms, now and then appears in my practice, and occasionally there is a death. But it is no unusual thing for me to have a hundred consecutive confinements without any symptoms that would cause a day's uneasiness. Perhaps a riper experience has had something to do with this success; but, in my opinion, strict cleanliness in all things as far as possible (and it is impossible to obtain that cleanliness without the use of a powerful antiseptic) has undoubtedly had far more to do with these results.

However, my share in this discussion is not how to keep away puerperal septicaemia, but, rather, how to treat the disease. Although the temptation is great to add a flower to the wreath of immortality which forever will encircle the brow of Semmelweiss, and to give one word of praise to Tarnier, who first used the mercuric chloride, still it is my duty to leave that task to my associates, who will give credit where it is due, and proceed to give what, in my opinion, seems to be the best plan of treatment for puerperal septicaemia.

The great object in the surgery of to-day in performing an operation is to exclude all septic material. This is especially true in modern obstetrics. Every precaution should be taken to keep away the poison germ, or, if it has gained a foothold, to destroy it as soon as possible.

The genital tract after labor has all the conditions favorable to the growth of bacteria. The abraded mucous surfaces, saying nothing of a lacerated os or torn perinaeum, afford ample opportunity for their passage into the general system. If microbes of a malignant nature have gained entrance to the parturient canal, either just before, during, or after childbirth, certain symptoms occur, which usually manifest them-

selves at about thirty to seventy hours afterward. These symptoms, to the experienced eye, prove that infection has taken place. Yet a case may occur occasionally in which there may be a doubt as to the proper steps with which to begin treatment.

When once we are sure that the poison is there, what is the best way to prevent it from doing farther mischief? Certainly only one plan naturally suggests itself, and that is, to clean out the vagina and uterus, and destroy with germicides any poisonous elements that remain. Often, washing out the vagina with an antiseptic solution will alone produce an immediate improvement in the symptoms of the patient; but if there should be no benefit after twenty-four, or, at the farthest, forty-eight hours, it is better to proceed at once to attack the whole of the parturient canal.

To do this, three things are necessary,—a Davidson syringe or fountain irrigator, an antiseptic solution, and a proper tube.

Perhaps a word will not be out of place regarding the tube which with me has the preference to all others. This is a hard rubber tube, which can be bought at a slight cost at any rubber store, in the form of knitting-needles. With the aid of boiling water, a file, and a sharp pointed awl or knife, it can, in a very few minutes, be made into any shape or form. On account of its cheapness it can be thrown away after using once, and therefore we can always be certain of having a clean tube.

Everything ready, the patient is brought to the edge of the couch in the forceps position, with a rubber blanket underneath her, so arranged as to guide the water into a small tub placed partly under the bed. The water should be hot enough to bear comfortably the elbow in it. After expelling the air from the tube, pass it gently to the fundus of the uterus, then withdrawing it slightly so as to be sure that the distal end is not in a uterine sinus, work the syringe with the slightest amount of force, using at least a quart of the solution, or, better still, a gallon, and watching that it flows back from the womb into the vagina, and thence into the tub.

As to the antiseptic to be used: After trying quite a number of others, I have returned to the mercuric chloride as the best. True, there have been some fatal cases reported from its use, but it has never been knowingly a source of danger to me, for the reason, perhaps, that I never use it stronger than one part to four thousand, and oftener as weak as one part to ten thousand. If the injections are going to do any good, they will do so at once. There is a fall of the temperature, the pulse becomes slower, and the enlarged and softened womb becomes smaller after each injection. Indeed, there is a general improvement. This irrigation may be used at first three times each day, and then be dropped to twice, and finally to once, as may be found necessary.

If there is no improvement, or only a very slight one, and the womb remains in a soft and flabby condition, and at each treatment small particles come away, it is evident that irrigation alone will not do the work, but needs more assistance. This can be obtained by the use of the curette, which with me has been productive of a great deal of good, and never of harm. Used in the same position as mentioned above, it is surprising what a large amount of débris can be scraped out of a uterine cavity after it has been thoroughly washed out for days. Surprise will often give way to regret, to think that the bacterial nests had not been destroyed long before.

For quite a number of years, when attending miscarriages, it has been my custom to empty the womb by means of the curette and the small placenta forceps, always supplementing the treatment by the antiseptic douche; and if the os is patulous enough to allow the finger to take the place of the curette, providing there has been no prior infection, almost perfect immunity from septic troubles can be promised.

The reason is simple enough. One hand having been introduced into the vagina, and one or more fingers into the cervix (nothing can take the place of the educated finger), the other hand, placed on the outside, pushing the uterus down sufficiently to reach the fundus and even each horn, all parts may be explored and scraped out, and the cavity so left that

it can be put in a perfectly antiseptic condition. In that condition no baneful results can follow.

So it is in the treatment of puerperal septicaemia. When infection has once taken place, the great object is to remove quickly, and as thoroughly as possible, the matters that do not belong to the parturient canal, and to make innocuous what remains. If we fail, it is either because the poison has entered through some other avenue of the body, or because the main army of the destructive germs has passed into the system, and only the rear guard is left for us to fight against by local treatment.

The older obstetricians taught that the genital organs of a woman after labor were intolerant of manipulation. That is only true now when the manipulator is ignorant or unskilful.

How often does it happen that septic troubles follow the removal of the retained placenta! And why is this so? Simply because when nature is unnecessarily interfered with, or requires the aid of art, she requires in no uncertain way that her methods shall be closely followed. In other words, when nature removes the after-birth she does it thoroughly, and leaves no poison germs behind; if artificial aid is required, and does not do it as thoroughly as she, a heavy penalty must be paid.

Without doubt, many cases of puerperal septicaemia will get better without the aid of antiseptic treatment; but it is my firm conviction that where one will pull through, depending only upon the older methods, ten will die. It is understood, of course, that the severer types of the disease are meant.

Many times after labor, without any appreciable cause, there is a high rise of temperature which soon passes away without any treatment, or upon the administration of an antiseptic. It is only the temperature that lasts longer than twenty-four hours that is a source of anxiety. High temperature is not always a forerunner of evil. Other symptoms are to be taken into consideration, and it would be injudicious, to say the least, to resort to irrigation without waiting

for farther developments. But in my experience early irrigation has never been attended with any evil results; on the contrary, in quite a number of cases delay has been a matter of regret.

If, as has been said before, the vaginal douche does no good, after having been used at intervals of four hours for twenty-four hours, or, at the farthest, forty-eight hours, the intra-uterine douche should be substituted at once, and used at least three times in the twenty-four hours, and as long as good results are obtained, and until the patient is cured.

If the trouble proceeded from the vagina, and is there alone, intra-vaginal injections will soon change the bad symptoms into good ones; if, however, the mischief is in the uterus, intra-uterine irrigation may have to be aided by the curette. If, after that procedure, followed by injections for two or three days, there is no benefit, you may be sure it is of no use to continue them. The poison has entered into the general system, and is beyond the control of local measures, or infection has come through some other channel of the body, and has to be treated as such.

If the intra-uterine injections do good, the pulse will very soon become slower and the temperature lower; the womb will contract, and gradually become smaller; the lochia will become inoffensive to the smell; and the injections may be discontinued just as soon as there is a certainty that no dangerous material is left in the genital tract.

Regarding the general treatment of the disease under consideration, although much could be said, it is my intention to say very little.

One of the first things to do is to get the patient into a large room, with plenty of fresh air but no draughts.

Give a light but nutritious diet.

The obstinate vomiting may usually be brought under control by cocaine, or, better still (if it will alone do it), by peptonised milk.

Antipyretics should be given often enough and in sufficient

quantity to keep the temperature below 100° F. Opium (which in some of the inflammatory types of the disease is the sheet anchor of hope) should be given in doses large enough to quiet pain and produce sleep, although perhaps chloral would be the better remedy to produce the latter result.

Early in the disease the antipyretics not only lower the temperature, but provoke copious diaphoresis, which is, without question, a valuable help to nature's method of throwing off the disease after it has gained entrance into the general system. Later, they seem to weaken the heart's action, and then it is wise to give alcohol in some of its various forms, which, "when given fully, saturates the system, sustains the strength of the patient, and by its affinity for fat penetrates the cells, checks metamorphosis of tissue, and retards bacterial activity."

PARTURITION IN A ROOM INFECTED WITH RUBEOLA, AND THE CONSEQUENCES.

By N. W. Leighton, M. D., of King's County.

October 11, 1888.

I attended Mrs. W., age 28, in her second confinement, on December 13, 1886. Parturition was normal, and consummated in five hours. No unfavorable symptoms were apparent until December 16, when she had a chill, followed by a temperature of 104° and pulse 120. She had pains in both breasts, and scanty lactation. The fever continued through the 17th, and on the 18th she had another chill at seven in the morning, and vomiting, followed by profuse perspiration, and an evening temperature of 105°, pulse 120, and rapid respiration. From the 19th to the 23d the temperature fluctuated between 104° and 101°, and copious perspiration occurred several times. On the 24th the temperature was 99°, the pulse 76, and the patient said she felt well. Lactation did not cease, and the lochia continued without abnormal odor. She vomited on the 25th, and again on the 26th, when the temperature rose to 104.2°, and abdominal tenderness and tympanites were manifested in a moderate degree. The fever declined on the 27th, and the temperature ranged from 99° to 98° during the next four days. Again she said she felt well, and that she was hungry and would like a full meal. But on the 1st day of January, 1887, the pulse was 112, the temperature 102.8°, and a painful swelling appeared in the left iliac region. For several days the swelling increased in tenderness and in size, till it equalled a large orange, though oblong in shape, having a length two or three times its breadth. The swelling began to diminish in a few days without any evidence of suppuration, and on the 20th

of January was reduced to about half its former size, when I dismissed the patient, leaving her comparatively well.

The symptoms appeared so much like cases of puerperal fever as described by Dr. Fordyce Barker in his "Puerperal Diseases," that I declined to attend any parturient women during my care of Mrs. W. I had not treated nor seen a case of puerperal disease for several years, nor did I learn of any case existing in that or in the adjacent wards. Neither did I have occasion to treat a similar case subsequently to that time. While the mother was passing through her puerperal sickness the babe sickened with erysipelas, and died on the 10th of January, 1887. The disease suppurated in the child's right arm on December 31, 1886, and spread from the labia and nates up over the body and down over the thighs. It appeared a little later on the right hand, then on the nose, and finally in a gangrenous patch on the left elbow. What was the disease which affected Mrs. W., and whence its origin? The following is the only explanation I can offer, viz., her daughter, two years of age, sickened with rubeola on the 30th of November, two weeks prior to the mother's confinement, and in the same rooms, and her sister's two children had rubeola on the floor below her, about four weeks before her confinement. The house was fumigated with burning sulphur three days before Mrs. W. was confined, and fumigation was to have been repeated in a few days.

Did the contagion of rubeola generate erysipelas, or are they companion diseases? Was the sickness of the mother and the babe the result of the one cause? I hope the discussion of to-day may enlighten me.

I may add without detail that quinine, Dover's powder, morphine, aconite, veratrum viride, and the bromides were administered as symptoms seemed to indicate; that no treatment was directed to the vagina, as none seemed, from the character of the lochia, to be required. The bowels moved every two or three days without special treatment.

I have since learned that the swelling referred to increased

again; that Mrs. W., under the direction of another physician, consulted a prominent surgeon whose skill I can vouch for, and that he pronounced it sarcoma—an error he would not have made if in possession of all the facts.

Mrs. W. is now in good health, and has menstruated regularly ever since her illness. There still remains a small indurated mass, apparently adherent to the appendages of the uterus on the left side. It is not a source of inconvenience to her at this date.

REPORT OF A CASE, SUDDEN IN ATTACK, HISTORY UNCOMMON; SYMPTOMS SEVERE AND ALARMING, WITH DOUBTFUL DIAGNOSIS.

By B. L. Hovey, M. D., of Monroe County.
(Read by title.)

October 11, 1888.

Mrs. K., a healthy, intelligent woman of medium size, of nervo-sanguine temperament, aged 27 years, was delivered of a healthy male child, July 16, 1888. Primipara. During gestation she had none of the ordinary sickness peculiar to that condition, so that at the time of labor her physical condition was excellent.

Her labor was natural in all respects, but tedious, and the pains were very severe for several hours before labor terminated. She soon rallied, and had a good and healthy convalescence. At the end of two weeks she was out of bed and about her room. The secretion of milk was abundant and of good quality. The lochial discharge had ceased, her appetite was good, and the bowels and other secretions in a healthy state. To all appearance the woman had recovered her usual health, as far as possible in the time after a severe labor.

From the 31st of July to the 14th of August I did not see the patient, but her improvement was continuous, without an accident or any unpleasant symptom. Her condition was such that she and her husband thought it no harm to visit her mother, half a mile from their home, just four weeks after her confinement. The walk was taken, and after a rest of one hour they returned to their home. She did not appear fatigued or harmed in any way by the mile walk. The next day everything went on well: there was no complaint of pain in the back or limbs, or other evidences of over-exertion or fatigue. She rested well at night, and took her meals with the usual relish. The bowels and kidneys performed their duties well. Not a premonitory symptom preceded a severe chill with active delirium, commencing at 2 o'clock P. M., the second day after the walk. The chill lasted three hours.

I saw her at 5 P. M. She lay on her back, limbs in natural position, eyes closed, pupils normal and responding to light, mouth closed, and teeth rigidly tight together. No increase of heat of surface of body; pulse 100; respiration regular and natural; no effort of deglutition, and

totally unconscious. No means used had the slightest effect to arouse her.

The treatment at this time was expectant, thinking that perhaps it might be that disease which simulates all diseases, and largely supplies a term for ailments when a diagnosis is uncertain. Saw the patient again at 9 P. M. Mental condition unchanged; breathing more rapid; face more flushed; pulse 120; temperature 104.5° in axilla; mouth and teeth firmly closed. Again I suspected that hysteria was the disease from which my patient was suffering, and that it was due to some functional disturbance. A vaginal examination showed the uterus to be in position and in all respects normal, as far as could be so soon after confinement.

I prescribed bromide of potash and tincture of aconite alternately in the usual doses. She remained in the same condition through the night. Urine passed unconsciously during the night, and estimated to be abundant.

15th. At 6 A. M. hands and feet cold. At 7 A. M. a convulsion lasting three minutes. Face and lips livid and turgid; muscles of mouth and right side of face slightly drawn to one side; eyes closed; lower limbs rigid, with spasm or jerking of flexor muscles, which continued through the day; mouth and teeth firmly set together; no mental change; urine passed involuntarily.

9 A. M.—Temperature 104.5°; pulse 130. Treatment continued.

4 P. M.—Symptoms unchanged; gave 10 grs. of calomel.

5 P. M.—Convulsion, lasting much longer, and spasms more severe. Face and limbs livid and swollen. Rectum emptied by water enema. Drew the urine, suspecting albuminuria. On examination, specific gravity 1021, acid; no trace of albumen.

9 P. M.—Temperature 105°; pulse 120. Mental condition unchanged; hands and feet cool and clammy to the touch. Forced by the mouth 1½ ounces of castor oil, to be followed by an enema if necessary. At 4 A. M. bowels moved freely, after using a large quantity of water.

16th, 8 A. M.—No mental change; temperature 105°; pulse 130; hands and feet cold; face pale. Gave 6 grs. sulphate of quinia every four hours; milk and beef-essence per rectum, etc.

4 P. M.—Convulsion, lasting several minutes. Pulse and temperature unchanged; head turned to right side, and partial loss of muscular power in left arm. In attempting to straighten the head there was evidence of pain. An ice pillow was now applied to back of head and neck. Breathes with a catch,—that is, a deep inspiration and then suspension. Gave per rectum 20 grs. of chloral hydrate and 30 grs. of bromide of potash, with directions to repeat if more convulsions occurred; antipyrine, 4 grs., substituted for the quinine.

17th, 8 A. M.—Temperature 103°; pulse 94. Mental condition slightly

improved. Opened her eyes and recognised her husband. By request, protruded her tongue, which was heavily coated and white. Head drawn to right side; increase of pain in limbs on motion. Antipyrine continued. Nourishment, milk and essence of beef.

4 P. M.—Temperature and pulse the same; semi-conscious at intervals.

9 P. M.—Temperature 99°; pulse 88. Hyperaesthesia of lower limbs and severe muscular pain on motion. Asked to see her child. Spoke rationally. Slept well through the night, and was inclined to sleep most of the time. Secretion of milk nearly suspended. Antipyrine given at greater intervals.

18th, 8 A. M.—Temperature 97°; pulse 78. Rested well at night; eats sparingly, and with some difficulty in deglutition. Limbs extremely sore on motion, and inability to move the head. Antipyrine discontinued.

9 P. M.—Temperature normal; pulse 78. Slept most of the day. No attempt to move in bed; extremely sensitive to pain on motion; mind clear at intervals; head inclined to right side, and drawn backward slightly.

19th, 9 A. M.—Temperature 97.5°; pulse 78. Rested well during the night. Surface cold; retention of urine; ideas disconnected, but answers questions correctly; expresses kindness and care for her child; eats well and with unnatural rapidity. Milk-punch administered liberally.

5:30 P. M.—Temperature 98°; pulse 80. Eats and sleeps well; evacuations natural; mind unsettled and easily disturbed. Milk-punch continued. Secretion of milk nearly suspended.

Dr. Colvin saw the patient, and got the history of the case at this visit.

20th, 9 A. M.—Temperature 98°; pulse 80. Good night, slept well; calls for food; desires to nurse her child; mind unsteady; asks irrelevant questions, and mind wanders at random.

6 P. M.—Temperature 98.5°; pulse 80. Passed a good day; complains less of soreness in neck and limbs; is somewhat emotional.

21st.—Patient is doing well, and convalescence is now fairly commenced.

She improved slowly from day to day, and is now fully restored to health, with ability and strength to attend to her domestic duties and care for her child.

A review of this uncommon case points to three conditions or classes of symptoms, indicating three diseases of different causation, and distinct in pathology. I shall only mention some of the prominent symptoms of each, without an attempt to discuss the subject.

The first class of symptoms points to functional disturbances. The sudden attack, the position of the person, the

eyes, the firm contraction of the mouth, the fixedness of the teeth, the inability to arouse the patient, the normal breathing, the cold surface, are recognised symptoms of hysteria. These were considered and believed to be sufficient evidence to justify the conclusion that functional disease existed to such a degree as to cause the condition of the patient when first seen by me.

The second class of symptoms were,—a cold sensation (not a chill) followed by high temperature, rapid pulse, flushed face, and, later on, convulsions, with a degree of regularity as to time, followed by increased heat and arterial action. From these, it was believed to be malarial in character, and to require antiperiodic remedies. Without relief, the patient's condition grew worse; the convulsions were more severe. The lividity and swelling of the face; the partial palsy of the left arm; the drawing of the muscles of the mouth, and fixedness and retraction of the head; the hyperaesthesia; the evidence of pain in the neck on motion; the continued high temperature and quick pulse; the total unconsciousness; the muscular pains in the limbs on motion,—all these are among the symptoms of acute spinal meningitis.

One thought more relating to this case. Did the antipyrine, given in four grain doses every four hours, have the controlling influence over the temperature to reduce it from 105° to 97° in forty-eight hours, and in the same time the pulse from 130 to 78? And again: Did the 20 grains of chloral hydrate with 30 grains of bromide of potash, per rectum, arrest the convulsions?

A NEW PLAN OF TREATMENT FOR PNEUMONIA.

By G. R. Martine, M. D., of Warren County.

October 11, 1888.

Every new theory is at first more or less ridiculed by the incredulous class, and the number of those incredulously inclined is as large to-day as when Harvey discovered the circulation of the blood, or Jenner promulgated the boon of vaccination: hence no surprise will be created if this new plan of treatment for pneumonia be derided, or even denounced in terms more vigorous than elegant. But yet, among you all there may be one patient investigator still searching for truth, who will give this new theory a practical test; and if so, he will be induced to make a second trial; and when he ascertains that substantially it never fails, it will then become his fixed, permanent, and unalterable practice in the treatment of pneumonia.

No attempt will be made in this paper to enter into an extended research or exhaustive analysis relative to the cause, pathology, or results of pneumonia, or to discuss at length its different forms and phases. It is simply to a new plan of treatment that your attention is called, and to this point all efforts will be directed. Almost every known plan has been adopted in the treatment of pneumonia, and new remedies have been eagerly sought after. First one and then another has played its role on pneumonia's stage with but indifferent success. Bleeding, vomiting, sweating, blistering, poulticing, depleting, stimulating, all local and all general plans of treatment, have been faithfully and persistently carried out with marked thoroughness; yet to-day, after all the advancement made in the science of medicine, pneumonia, though a curable disease, stands second only on the roll-call of Death. Shall we continue longer in these old ruts, with this appalling

death-rate staring us in the face at every step, or shall we seek out a new and more rational plan of treatment?

The first abnormal symptom observed after the premonitory chill has warned us of pneumonia's approach is the quickening of the pulse and the consequent increased flow of arterial blood.

Now, if we could take a microscopic view of the minute arterial ramifications in the lung structure, we should discern a distention of the arterial vessels in order to accommodate the augmented flow of arterial blood; and if we could then cast a glance at the veins, we should see the plasma-layer rapidly filling with multitudinous white corpuscles, and the walls of the veins, irritated by the friction of increased circulation, would exhibit here and there a white corpuscle adhering to their tenacious sides, and finally penetrating their walls. A glance at the capillaries would show not only the white but also the red blood-corpuscles forcing their way through the overstrained capillary walls, until the surroundings became engorged by their extravasation, and the initiatory work of hepatisation had commenced.

Now what are we to do, at this stage of the disease, to hold in check this increased flow of blood in the lungs, which, if unrestrained, is sure to end in consolidation and death? Reducing the temperature will not accomplish the work; it does not save in pneumonia as in idiopathic fevers.

To what plan, then, shall we resort in this exciting emergency to save the patient from being suffocated by his own blood? Before an answer is given, allow me to use a simile: Should some mischievous hand hoist the gate of an immense reservoir, located at an elevation of a thousand feet above this city, and the maddened waters, fiendish with the power of inundation, should sweep through your streets undermining block after block, and strangling all life within reach of its destructive course, would you not intuitively cry out, Shut down the flood-gate and save the city?

When the maddened blood, fired by the lash of inflammation, rushes wildly through the channels of life, extruding

with demoniacal force through the very walls of the blood-vessels the blood-corpuscles, and threatening to strangle out the life of the unfortunate victim, intuitively I cry out, Shut down not the head-gate but the heart-gate, and thus save the suffocating patient who helplessly looks to you for rescue! say to the wildly pulsating heart, So far or so fast shalt thou go, and no faster,—and continue to hold the heart's action under subjection until the crisis is past and the life of the patient is saved. This crisis is usually reached about the seventh day after the chill. This is not only what should be done, but what *must* be done, in order to ward off death.

You will naturally ask if this new plan is intricate or difficult of adoption, or if it be so extended or complicated as to render it practically inoperative in the hands of the busy practitioner. The answer is, No. The whole method can be given in five words: Hold the pulse below eighty. Keep your fever thermometer in your pocket: it is of little or no use in pneumonia. Death does not result from high temperature in pneumonia, but from high arterial action and consequent heart-failure.

You may ask with what remedies the pulse can be held at this point. While veratrum viride seems to have served me best, doubtless there are other arterial sedatives which may act as well. It has heretofore been the practice of medical writers to name the medicines to be used in the treatment of such diseases; but in the light of the present day it would be well to drop this antiquated custom, and to state the indications to be fulfilled, the dangers to be avoided, the vantage-ground to be gained, the favorable signs to be sought for, and the unfavorable symptoms to be controlled, the main points to be attained, and the results to be expected in the successful management and treatment of any disease, and then allow the attending physician to select such remedial agents as he may choose among those possessing his confidence after long experience in their use. In pursuance of this course, no radical line is drawn or arbitrary rule laid down as to the remedial agents used, provided they are suc-

cessful in accomplishing the work of holding the pulse below eighty if in adults, or in children from 100 to 120. This point attained, and with persistent vigilance maintained, no farther trouble need be apprehended, for with the pulse at or below 80, there will be no extravasation of blood; if no extravasation, there will be no consolidation; if no consolidation, there will be no hepatisation; and if no hepatisation, there can be no suppuration, mortification, or death. Hence pneumonia, by this plan, can be robbed of all its terrors.

But the inquiry may be made, What is there in this plan to provide against heart-failure, a condition so greatly to be dreaded? I would reply, It is far better to *avoid* a calamity than to provide for one. No censure is due the captain of a man-of-war who thickly covers his deck with sawdust to prevent slipping when blood shall flow freely; but a higher meed of praise is accorded to him who so carefully erects defences, so skilfully plans the attack, so closely watches the progress of the battle, and so adroitly conducts the fight, that but little blood need flow. So, in this new plan of treatment for pneumonia, but little blood will flow if the pulse be kept below eighty; if no blood be extravasated, no consolidation takes place; and if no obstruction from consolidation exists, the heart's muscular labor is not increased, and it is not fatigued by making, for days, from 3,000 to 4,000 strokes per hour above its normal number. Heart-failure is a thing impossible in uncomplicated pneumonia.

SEA-SIDE HOSPITALS FOR SICK CHILDREN.

By Charles A. Leale, M. D., of New York County.

October 11, 1888.

As chairman of the Sea-Side Hospital Committee, and also chairman of the Building Committee of the St. John's Guild, an institution for the care of the sick poor children of New York city, and as a member of our Floating Hospital Committee, I have had for several years under my observation an annual average of over twenty thousand sick children. During the past summer our Floating Hospital gave daily excursions to the ocean to 26,353, and our Sea-Side Hospital had, as resident patients, 1,409 sick children with their mothers. When it is remembered that these thousands of helpless, sick babies are all sent to us by private physicians, the medical attendants of our numerous charitable institutions, and the inspectors of the Health Department of New York city, it may be readily understood how vast is the amount of misery to be found, when sought for, in America's largest metropolis. But New York is not alone in presenting such an array of facts, as my observations have led me to know, after visiting the habitations of the rich and the poor of the majority of the largest cities of Europe and North America.

The sanitary as well as the political necessity of guarding the health and guiding the proper development of the children of the poor of New York city is of more than ordinary, even of national, importance, as the thousands of immigrants constantly arriving at this the principal seaport of America attest, and presents to us problems of the most profound nature, when we remember the large proportion that remain with their children in their first port of landing. These immigrants, frequently with large families, immediately seek homes in our midst, and the little children are often at once

thrown upon the indulgence of the public and private institutions of New York city for free medical care, and for instruction at our free or industrial schools. These children of foreign birth, if properly cared for at an early age, are prepared to contribute toward the maintenance of the family, very soon become self-supporting, and, at the age of twenty-one years, are granted all the rights of American citizenship, having an equal power at all the elections,—national, state, or municipal,—with those who have millions invested in real estate. I have often seen adults who have lived for years in America still continuing in the customs of the mother country, and have heard them speak only the language of the alien ; but this cannot be found true with their children, who quickly learn and appreciate the benefits of free institutions, and, if they acquire knowledge, and grow strong, healthful, and moral, soon become powerful factors in their adopted country.

On the other side, if we examine the annals of our penal institutions, we find revealed to us the startling results of neglecting to care for the young child. In visiting a number of places where either the chronically diseased or criminals are cared for, and in a kindly manner conversing with these outcasts of society, I have been impressed with the many answers confirming the fact that from the time of birth they were exposed to misery and disease, and grew up surrounded by the temptations of the malicious, degraded, and weak-minded.

Philanthropists can find no better field in which to cultivate their love of mankind, or to exhibit benevolence for the universal good of the human family, than by preventing the diseases or the deformities of the helpless sick children of the poor, always to be found in all large cities.

Twenty-two years ago the St. John's Guild was organised, with the object of caring for the poor of the great city of New York, and for several years continued its usefulness in such general work; but with the wonderful increase in population, and consequently the limited number of houses in the

densely crowded portions of the city where the poor reside, and the many other means adopted for general relief, it was decided that the St. John's Guild could better accomplish its purpose by devoting its energies toward the relief of the sickness and misery of the thousands of helpless infants who were each summer in such large numbers suffering from neglect and disease,—and it soon became apparent that this could best be done by removal for several days from their homes to a Sea-Side Hospital. In establishing a Sea-Side Hospital for the treatment of the acute non-contagious diseases of children the St. John's Guild had to take the initiative, it being the first of its kind, and even now, I believe, with its new wing, the largest Sea-Side Hospital for sick children in the world, having accommodation for 240 residents, and a Floating Hospital large enough to carry from 1,200 to 1,400. We feel that by caring for these masses of humanity we shall do very much to improve the future American citizen.

Our Sea-Side Hospital for the care of sick children is situated on one of the most beautiful beaches on Staten Island, at New Dorp, within ten miles of New York city, and includes ten acres of good farming land, with a frontage of 280 feet directly on and facing the ocean. The hospital has been built in accordance with the American pavilion plan, which is now recognised to be the best for sanitary purposes. Its foundation is securely laid on heavy timbers placed directly on the hard-pan, from five to eight feet below the surface of the sand, where they are securely retained in position, and form one continuous foundation support. On this, upright wooden supports project through the sand to a distance of about four feet above the surface, and on their ends the heavy beams of the building rest, thereby leaving a free open space beneath, which is never utilised for any purpose except to give free circulation of air under all the buildings. To prevent any contamination of the sand by the children, an open lattice has been placed, which entirely surrounds the hospital foundation.

Our hospital comprises a central or executive building,

with oblong wings in direct lines on each side, each wing being 100 feet long and 25 feet wide. There are two stories running the entire length of the hospital, and both of these stories are surrounded by wide piazzas, where chairs are arranged for the mothers, or where they may watch their children at play in the open air during the rainy days. As all the windows from the wards are wide and large, they can be utilised at any time as a means of hasty egress, although there are regular doors for every fifty feet of ward length.

Fire escapes are at the ends of each ward, directly leading from the piazzas to the ground. There are four separate flights of stairs the entire height, two at the end of each wing, in addition to the large staircase of the central or executive building.

The entire structure is built of pine, covered on the inside with a thick coating of shellac varnish, and on the outside painted in oil. In front of the central building is a projection, serving on the lower stories as main entrances, and giving a room near the front door for one of the physicians on one side, while the room opposite is used by the apothecary. On the upper floor of this portion we have two more rooms, and in front the large central office or general sitting-room, which has also a piazza in front. From the central building are double doors, leading to each of the four wards. These are 100 feet long and 25 feet wide, are made for 30 beds for adults and 30 cradles for infants, giving a total hospital capacity of 240 patients. At one time during the past summer, with only one wing in use, we had 126 patients, which necessitated the use of a few cots in the centre of the wards. After the completion of the second wing, we had at one time 255 resident patients.

The ventilation has received careful attention, there being lateral openings directly leading to the roof from and around the entire border of the ceilings of the lower wards, communicating directly upward with the open space at the roof. The ceiling ventilation of the upper wards is by means of an opening in the centre extending the entire length, and also

opening into the space of the permanently open latticed double roof above. Special care has been taken to make the building as nearly sanitarily perfect as possible. The cots are placed side by side with a window between, and form two rows, with a wide central passage running the full length of the wards.

The beds in use are the St. John's Guild Sea-Side Hospital cribs, being the outcome of devices and suggestions of members of our own committee. They resemble the ordinary iron cot, with a spring mattress, and have iron extensions from the two lower corner-posts curved upward and inward to form davits, from which the infants' cradles are suspended. These may easily be swung backward and forward as the mothers lie in bed, thus, at all times at night, keeping the infants within easy reach, so that they may be attended to, nursed, or quieted without disturbing the others in the ward. These cradles have been found to be safer for the infants than the ordinary beds; and the davits above them, from which they swing, are also utilised as bars to hold in position mosquito netting. I have often seen more than 100 infants quietly sleeping in these cots at midnight, thus securely protected from outside annoyances. On one of my visits, when we had over 250 patients in the hospital, I inspected all the wards after midnight, and did not find one suffering from pain, or crying: the soothing sea-air influence had lulled them to sleep. To many poor wives or widows, who must toil to support their families during the winter, the rest and medical treatment received at the Sea-Side Hospital are the little respites of comfort and pleasure that enable them to maintain their severe struggle for existence.

These children are those of the sick poor, who are crowded together in small apartments, where for weeks most of them never leave the floors on which they reside. They are found by charitable physicians, who distribute our tickets of admission. They are taken by us on our steamboat to the Sea-Side Hospital, kept there, and returned to their homes without charge.

Several years ago I was requested to examine a little girl who had fallen from the third story window of a crowded tenement-house. It was mid-summer, and this little one had been kept for weeks in her city home, in the midst of disease and surrounded by vermin. All the fresh or pure air she could get was admitted by the open window. She longed for more fresh air, went to the window, and fell to the pavement beneath. On my examination, I found that she had fractured eight bones of her body. After a long illness she completely recovered without any deformity, and was helped to secure a more healthful atmosphere by wealthy people. This was not an unusual instance, for each year children have fallen from the roofs of high buildings, and have been killed, during the hot season, after they had fallen asleep in their search for fresh air.

Two years ago, in consequence of a political misunderstanding, and for want of the usual appropriation, the officials of the Health Department of New York city stated that it would be impossible for them to appoint the usual summer corps of physicians to visit the sick poor children in the crowded portions of the city. The previous ten years' experience in observing this necessary, humane work by the Sea-Side Hospital Committee of the St. John's Guild had taught our board of trustees that many families had been led to expect this attention from the public officials, and that if such medical services were not rendered, many of the poor, helpless, sick infants of this city would languish and die, unattended by the medical profession. A meeting was therefore immediately called, and several members of the board of trustees volunteered to devote gratuitously the time appropriated for their own summer vacation to this necessary yet very arduous and dangerous work. Before the end of a week, with an appropriation of only six hundred dollars, a sub-committee for this purpose had been organised, and at the usual time to begin such work I had appointed six enthusiastic physicians at merely nominal salaries to go from house to house, seek out the diseased and dying poor children, prescribe or purchase

medicines for them when they were too poor to do so themselves, and when very deserving ones were found whose lives might be saved by hospital care at the sea-side, to send such, with their poor sick mothers, to our beautiful resort at New Dorp, Staten Island, where, free from all expense of transportation, board, medical attendance, and careful nursing, they enjoyed the pleasures of a week or two, and such food and pure air as restored many weary mothers to health, and gave their children an opportunity to overcome disease. As chairman of that committee, very many most distressing scenes, possible only for a physician to see, were brought to my notice; and our greatest grief was, that with all our endeavors very much was left undone, and I became aware of the appalling amount of distress among the neglected sick poor, who during the other nine months of the year are so well cared for at the very numerous charitable medical institutions of New York.

To visit abodes of degradation, abject poverty, and consequent vice; to see families of ten living in two hot rooms, surrounded by hundreds of other human beings in like conditions; to get the sickest of the children taken on our Floating Hospital to our Sea-Side Hospital, where they had pure air and procured all the enjoyments of a sanitary sea-side resort, was to effect oftentimes a transformation that even photography would fail to depict.

But, with all these disconsolate and neglected ones, it may be asked, Where are our religious organisations, where our charitable societies, and where those rich corporations which are accumulating in this city so much land and money? Frequently here, as I have also seen in London, the richest hospitals have a superabundance of empty beds. The poor may well ask, Why these huge piles of masonry, why the exemption from taxation of so much valuable land, and why are such "hospital-hotels" called charitable institutions? It is a well known fact, that a wealthy person from California, Oregon, or Texas may with great ease gain access to the paying wards of some of the institutions endowed by charity

and freed from all municipal or government demands, by paying as he would were he at the Fifth Avenue or Windsor hotel, and yet the worthy poor, for whom these very buildings were endowed and erected, are often refused entrance. Within a month I had occasion to visit a rich person in one such place, where he was paying sixty dollars a week, in a building erected and endowed for charity by the will of a deceased New York merchant.

Well may we ask, Why should the citizens of New York have to pay higher rates of taxation? Why care for outsiders at the expense of the city, and neglect our own deserving ones? I bring this to your notice to emphasise the fact that the Sea-Side Hospital of the St. John's Guild has never had, and I hope never will have, a paying cot. No one to my knowledge has ever paid a penny to any one of our officials or employés for any of the benefits received. The St. John's Guild is eminently a charitable institution, and whatever it has it gives freely and without cost.

There is no more lonely place for a human being than a great city. There is no securer place in which for years he may live in secrecy, and his identity be entirely lost or forgotten. In the country the hermit has the wild beasts and the birds for his companions, the sun shines for him, the flowers bloom, the earth may pour out food in abundance, but in the city the proud but poor unfortunates may unjustly remain for years breathing a stifled atmosphere. It is to these, when their children become sick, that our Sea-Side Hospital brings benefits. Their poverty is respected, no questions need be asked, the observing physician recognises such facts just as readily as he diagnosticates a malignant disease, and he alleviates their distresses accordingly. We reach a class left untouched by all the other charities. We seek them out, and do our utmost to improve and elevate them. I have personally observed weary mothers, with six or more children all under twelve years of age, with a crippled, incurable, epileptic, or idiotic child, just about giving up in despair, when the Guild stepped in and gave rest, recreation, and medical aid,

such as no other institution does. There are many cities beautifully situated to copy our example, and have a sea-side or country hospital, with all the necessary outfits. Our Floating Hospital (which cost us over $25,000), towed out to the ocean with its freight of over 1,200 sick poor children and their mothers, with its band of music and the playing or sleeping little ones, and our Sea-Side Hospital, are illustrations of one of the best charities of New York city.

The wells of our Sea-Side Hospital are about fifty feet from the pavilion containing the kitchen and laundry, and are made by driving iron tubes through at least two layers of clay or hard-pan; they are sealed at the top, the ground around their point of exit forming the apex of a mound. Between the kitchen and laundry is a space about five feet wide, the upper portion of which, holding about 2,500 pounds of ice, serves to keep the temperature low in the chilling-room beneath. In addition to this chilling-room we have a large upright refrigerator, and in these two places are kept all the meats, vegetables, and perishable food. The dining-room is at the end of a lower story of the main building, and is about 25 by 50 feet in size. The food-supply has always been abundant and of good quality. The milk is the best that we can obtain, and during our active season 200 quarts are required daily. The infants are supplied with any artificial addition to their diet which may be necessary to aid its digestion; but my observation has led me to believe that the upper third of the milk, largely diluted with water, to which powdered barley, rice flour, or oat meal is added, will, as a rule, suffice. In certain cases we give the expressed juice of rarely-cooked beef, or the whites of raw fresh eggs mixed with pure cool water. But all foods, even the mother's milk, will at times cause aphthae to arise from the milk remaining in the mouth. This fungoid growth is readily prevented or removed by washing all parts of the mouth after each feeding. For many years I have instructed nurses to take a clear, saturated solution of borax and water, and, with a soft linen rag over the end of the finger, to thoroughly swab the throat, the upper

and under surfaces of the tongue, the insides of the cheeks, and all around the surfaces of the gums and teeth, at the same time telling them that if a little be swallowed it can do no harm, as it is oftentimes beneficial to the stomach. The mothers are also taught this simple but effectual means of preventing an extension of the aphthae to the stomach and intestines, whence disastrous results may ensue from gastro-enteritis. We have found that the intelligent trained nurse often teaches the poor ignorant mothers many useful lessons in health, which, after leaving our Sea-Side Hospital, make them capable of frequently preventing disease. I have often been cheered by the devotion, self-sacrifice, good-nature, and intelligence of a number of the lady nurses, who, summer after summer, have struggled to do their utmost in alleviating the misery of the thousands of the helpless sick women and infants coming under our care.

We have two physicians carefully chosen for the work among the diseases of children, one of whom must at all times be on duty to attend cases of emergency. The senior medical officer is placed in charge, and is held responsible for the discipline and general management of the institution, but the professional care of the patients is as equally divided as possible. Each physician has his trained nurse, who accompanies him through the wards on his morning and evening visitations, when all the patients are examined. She then receives her instructions for food and medicine. After nine o'clock at night the nurse responds to all calls and administers the necessary medicines.

Experience has taught me that young children require very little medicine, and we have always followed the rule of giving as little as possible; but it must be remembered that painful symptoms or alarming conditions must be quickly noticed and their causes abated.

The stronger children and all of the adults are furnished with flannel bathing-suits, and the children, under the direct charge of their mothers and the general supervision of the nurse, are permitted to play in the sea-water during the

proper time of the tide, and when the air is the most desirable. For the younger or weaker ones the sea-water is taken to the building, where the infants are protected from the wind, and are bathed with the water at a suitable temperature. We have observed great benefit follow judicious sea-bathing, especially in strumous children. The children most benefited by a residence at the sea-side are the so called strumous, those with chronic glandular enlargements and ulcerations of the mucous membranes, ulcerations of the cornea, chronic conjunctivitis, and septic opthhalmia, which diseases as a rule rapidly disappear; but in no cases have I seen greater improvements than in those having old abscesses leading to dead bone and chronic otorrhoea. The attacks of acute gastro-enteritis, so prevalent during the summer, usually quickly respond to treatment, and in a very short time the little ones become robust and vigorous. The confirmed epileptics do not do well. Chorea is generally benefited more by the improved sanitary surroundings, wholesome food, and abundant exercise, than by any internal medication. The paralysis following diphtheria is overcome by massage, judicious bathing, and stimulating the desire to play as other children. Most acute and chronic diseases soon present evidences of improvement or cure after their causes have been removed and the general nutrition of the children improved. Children with pulmonary tuberculosis do not ordinarily do well, and the depressing influence soon noticed renders their change to a mountainous region desirable.

The reason why many neurotic children do not improve at the sea-side is, I believe, that in most instances they have no shade, but are for a number of hours each day exposed to the glaring sunlight, so slightly absorbed by the white, smooth, sandy beach. This we have overcome by a beautiful grove of cedar trees in the rear of the hospital, where the grass is always green and kept closely cut. There the children may play or sleep during those portions of midsummer days when it would be impossible to remain out of doors without shade.

The danger of sun-stroke I believe to be greater directly on the hot beach of the sea-shore, and I have seen a number of instances where the internal temperature of the body of infants has reached 105° F. after undue exposure. Whenever the temperature of a child denotes 106° we may soon expect convulsions, and if this temperature continues for several hours without any abatement, we may look for the symptoms of meningeal congestion and inflammation to be followed by plastic exudations within the delicate arachnoid, and occasionally resulting in epilepsy, idiocy, or hydrocephalus. Children, during their periods of dentition, should be specially guarded against the evil effects of the sun. Children with large, active brains are more susceptible than others, and those with light sandy complexions and bright golden hair more than those with olive skin and black hair. In the treatment of the intense fevers of infancy due to heat, during the first stage, when the heart is bounding from 130 to 200 beats a minute, aconite, in small, oft-repeated doses, appears the best remedy, and it should be given until the heart's action has been modified, the skin made moist, and the arterial pressure on the brain diminished. Severe headaches may follow, when the bromide of sodium gives the greatest relief. Of course, during all this time the warm sponge bathing and cool compresses to the head are necessary. Immediately relieve constipation, and keep the child in a darkened, well aired room, under the constant supervision of a good trained nurse. I may be permitted to raise my voice against the horrible practice of nurses, while taking their children out in their baby-carriages, permitting them to lie on their backs, with the rays of the hot sun shining directly in the infant's face. Many a healthful child of wealthy parents has been made a nervous neuralgic person for life by this torture.

The mortality rate at our Sea-Side Hospital has been less than one per cent., and we have never had a single accident due to carelessness, nor the death of a mother, to record. Thousands of children, who have come to us apparently in a dying condition, have been returned to their homes completely

restored to health, and their poor mothers so much refreshed, invigorated, and instructed in sanitation that their lives have been changed for the better, enabling them in their turn to exert a healthful influence upon their friends and neighbors.

PROCEEDINGS.

FIFTH ANNUAL MEETING

OF THE

NEW YORK STATE MEDICAL ASSOCIATION,

HELD AT THE HOTEL BRUNSWICK, FIFTH AVENUE AND 27TH STREET, NEW YORK CITY, OCT. 9, 10, AND 11, 1888.

FIRST DAY, TUESDAY, OCT. 9, 1888.—MORNING SESSION.

The Association was called to order at 10 o'clock A. M., by the PRESIDENT, Dr. JOHN CRONYN, of Buffalo.

The SECRETARY stated that it was impossible to announce the number registered from each district, because the registration was still in progress.

The report of the Committee of Arrangements was read by Dr. G. C. ARNOLD, chairman. (See page 17.)

Upon motion of Dr. FERGUSON, the report of the Committee of Arrangements was accepted and adopted.

Upon the suggestion of the SECRETARY, the Address of the PRESIDENT was postponed until the routine work of the session was finished.

The Annual Report of the Council was read by Dr. E. D. FERGUSON, Secretary. (See Annual Report of the Council.)

Upon motion of Dr. FERGUSON, the report of the Council was accepted.

The SECRETARY announced that the Treasurer was engaged in his official work, and that his report would be read either Wednesday or Thursday morning.

The SECRETARY stated that there were no special committees to report at the present time.

Under the head of new business, Dr. FERGUSON stated, would come up the question of increasing the annual dues. He believed that, with very few exceptions, the annual dues of the state medical organisations were

five dollars where they published a volume of transactions and furnished it to the members. Our Association undertook to carry on its work with annual dues of three dollars, and hoped they would be able to do so. The affairs of the Association had been administered as economically as possible. All the work of the Association has been done without salary or fees to any officer. We have entered upon the publication of a volume of transactions of which it is not necessary to deliver any encomium here. We cannot carry on the work of the Association and publish a volume of that character with the present annual dues. We must do one of two things, either change the character of the volume or raise the dues.

The time will come when there should be a Secretary who has a fee or salary for his service. That should be looked ahead to. If the Association grows much larger, the amount of work will be such that unpaid service as secretary should not be asked of any Fellow of the Association. The position is such that it should be held somewhat permanently, so that the individual shall become familiar with the Fellows of the Association. Some provision of the kind must be looked forward to in the not very remote future.

In spite of strict economy in the work, there has for three years been, at the time of the printer's bill coming in, a deficiency. He had been willing to divide that amount with the Treasurer until the dues came in, but it is unwise for the Association to require it. There will always be a certain number who do not pay their annual dues. You cannot count on the income of an Association by taking the number of members and multiplying it by the amount of dues.

President Cronyn said it seemed to him manifestly proper and correct that some steps should be taken to carry out the indications pointed out by the Secretary. Assessments will be more difficult to collect than annual dues of five dollars. The raising of the annual dues to five dollars does not seem too much.

Dr. Alfred L. Carroll said he could speak of the publication of the transactions with some knowledge by this time. He did not think it would be possible, with the number of papers presented, to reduce the cost of publication of the transactions. The actual cost now of the volumes, with the same quality of paper, binding, etc., has been far less than under previous arrangements. The present publisher has shown the greatest solicitude for the welfare of the Association, and has done the work at a very small margin of profit. He has felt an interest in giving the Association good work at a smaller price than any other printer that could be found. The Republican Press Association sent in originally lower estimates than any others, and even these were subsequently reduced. He thought it was therefore a question of increasing the dues or not publishing the transactions. The cost of binding is only thirty-seven cents a volume,

and the difference between that and paper would be a very small saving on the issue.

He moved that, in view of the small attendance on the first morning of the session, a full vote be postponed until to-morrow morning, when there would be a larger attendance.

The motion was carried.

The PRESIDENT announced as Committee on Scientific Contributions:

Dr. WILLIAM GILLIS, First District.

Dr. A. T. VAN VRANKEN, Second District.

Dr. C. L. SQUIRE, Third District.

Dr. B. L. HOVEY, Fourth District.

Dr. WILLIAM GOVAN, Fifth District.

The SECRETARY presented the annual reports of the District Branches and the New York County Medical Association, and moved that they be received and referred to the Committee on Publication.

The motion was carried.

PRESIDENT CRONYN then delivered the Annual Address to the Association.

After the first two papers upon the programme had been read, Dr. FERGUSON moved, and the motion was carried, that the remaining papers on the programme for the morning session be deferred until after the discussion on nosography, and then be taken in order.

The PRESIDENT announced that the Fellows from each district should meet at that time and appoint two members of the Nominating Committee from each district. After a recess of five minutes, the SECRETARY announced that the following members were appointed as the Nominating Committee:

Dr. J. W. S. GOULEY, at large.

First District, Dr. W. D. GARLOCK, Dr. E. F. MARSH.

Second District, Dr. C. H. BURBECK, Dr. GEORGE CONKLING.

Third District, Dr. C. W. BROWN, Dr. J. H. CHITTENDEN.

Fourth District, Dr. B. L. HOVEY, Dr. J. S. JAMISON.

Fifth District, Dr. J. S. BIRD, Dr. W. B. EAGER.

Adjourned to 1:30 P. M.

AFTERNOON SESSION.

The Association was called to order at 1:30 P. M., by PRESIDENT CRONYN.

The afternoon session was devoted to the discussion on Nosography.

NIGHT SESSION.

The Association was called to order at 8:00 P. M., by PRESIDENT CRONYN.

The night session was devoted to the reading and discussion of papers.

The report of the Special Microscopical Committee, appointed at the last annual meeting, was read by Dr. C. A. LEALE.

Upon motion of Dr. FERGUSON, the report of the committee was accepted and adopted.

SECOND DAY, WEDNESDAY, OCT. 10, 1888.—MORNING SESSION.

The meeting was called to order by PRESIDENT CRONYN, at 10 o'clock A. M.

The SECRETARY announced that there were about 112 enrolled last evening.

Upon motion of Dr. E. H. SQUIBB, it was voted that the question of amending the constitution be postponed until later in the day. The reading and discussion of papers was then resumed.

At the close of the session, Dr. FERGUSON moved the adoption of the resolution introduced last year, namely, that the word five be substituted for the word three in Article VI, Sec. 1, of the By-Laws, relating to annual dues.

The motion was unanimously carried.

Adjourned.

AFTERNOON SESSION.

The meeting was called to order at 2 o'clock P. M., by PRESIDENT CRONYN.

The afternoon and evening sessions were devoted to the discussion on tumors.

THIRD DAY, THURSDAY, OCT. 11, 1888.—MORNING SESSION.

The Association was called to order at 10 o'clock A. M., by PRESIDENT CRONYN.

The Annual Report of the Treasurer was read by the SECRETARY.

TREASURER'S REPORT.

JOHN H. HINTON, *Treasurer*,

In account with THE NEW YORK STATE MEDICAL ASSOCIATION.

From Sept. 27, 1887, to Oct. 10, 1888.

GENERAL FUND.

Receipts.

36½ assessments,	$73.00	
471⅓ dues,	1,414.00	
23 initiation fees,	115.00	
Sale of Transactions,	25.00	
Balance of fund subscribed for supper, 1887,	126.00	
Balance Sept. 27, 1887,	240.79	
		$1,993.79

Disbursements.

E. D. Ferguson, Secretary, postage, printing, &c.,	$84.25	
Angell's printing-office, ...	112.36	
Republican Press Association for Vol. 4, ...	1,422.48	
Glover C. Arnold, postage, &c.	1.80	
C. G. Crawford, printed and stamped envelopes, &c.,	54.50	
Rent of Library, 96 weeks, ...	96.00	
Treasurer for telegrams, ...	1.18	
Expressage vols. of Transactions, ...	5.25	
D. Appleton & Co., ...	3.75	
J. H. Vail & Co., distributing vols., ...	63.77	
		$1,845.34
Balance, Oct. 10, 1888, ...		$148 45
Building fund, ...		465.00
Cash in hands of Treasurer, ...		$613.45

JOHN H. HINTON, *Treasurer.*

This certifies that we have examined the above, and find that the vouchers and disbursements agree.

JOHN SHRADY,
E. H. SQUIBB,
Auditing Committee.

Upon motion, it was referred to an Auditing Committee of three.

The CHAIRMAN of the Nominating Committee reported that the committee recommended for election the following officers:

For President, Dr. WILLIAM T. LUSK.

For Vice-Presidents:

First District, Dr. S. H. FRENCH, MONTGOMERY County.
Second District, Dr. R. C. MCEWEN, SARATOGA County.
Third District, Dr. ELIAS LESTER, SENECA County.
Fourth District, Dr. THOMAS R. STRONG, CHAUTAUQUA County.

For Members of the Council:

First District, Dr. DOUGLAS AYRES, MONTGOMERY County.
Second District, Dr. J. B. HARVIE, RENSSELAER County.
Third District, Dr. J. H. CHITTENDEN, BROOME County.
Fourth District, Dr. R. J. MENZIE, LIVINGSTON County.
Fifth District, Dr. A. L. CARROLL, RICHMOND County.

Upon motion, it was voted that the SECRETARY cast the ballot of the Association for the officers recommended.

The ballot was cast accordingly.

The Chairman of the Auditing Committee reported that they found the report of the Treasurer correct, and moved the adoption of the report.

The motion was carried.

Adjourned.

Afternoon Session.

The afternoon session was devoted principally to the discussion on puerperal septicaemia.

At the close of the session President Cronyn addressed the Association in a few farewell remarks. He said he feared he had but poorly filled the position to which they had done him the great honor to elect him; but if zeal and a willingness to serve them far beyond his ability would secure their forgiveness for his shortcomings, he was sure of the forgiveness. Had he only had time to prepare a speech, he would have liked to say much of the glorious progress of the Association. He could do no better than repeat his reply to a gentleman who said the Association could not grow because it was too scientific: "That is what we are for"—for the attainment of scientific advancement in medicine and surgery. He trusted that while he had strength to come to New York each year he could aid that scientific activity which he was sure would never cease. He would ask them to strengthen, with him, a man active in the direction of this scientific culture, that will in the end redound to the glory of the New York State Medical Association. He would introduce to them a man they all knew, whose renown was far beyond the limits of New York, their president-elect, Dr. Lusk.

Dr. Lusk said it was certainly a matter of great surprise to him, when, after his clinic that morning, he was informed of the deed that had been committed there, knowing that he had not deserved any such honor for the work he had done for the Association—knowing, as they did not, how little fitness he possessed for presiding over an assembly. All he could bring to them was an attachment for the Association, an earnest desire for its prosperity, and an earnestness to do everything in his power to further its welfare. The excellence of the Proceedings of the Association in times past was shown by the volumes already published. He hoped they would all pledge him their cordial assistance and coöperation, that the volume of the coming year might in no wise fall short of those that had preceded.

Upon motion of the Secretary, it was voted that the Association should adjourn.

E. D. FERGUSON, *Secretary.*

REPORTS OF THE DISTRICT BRANCHES.

FIRST DISTRICT BRANCH.

The fourth annual meeting of the First District Branch was held at Amsterdam, Montgomery County, on Tuesday, July 10, 1888.

The meeting was called to order at 10 A. M., and the minutes of the last annual meeting were read and approved.

The Chairman of the Committee of Arrangements, Dr. S. H. FRENCH, then reported provisions for a meeting for one day with a forenoon and an afternoon session.

The report of the Treasurer was read and approved.

Twenty-six Fellows and guests were present.

On motion, the President's Address was deferred until the afternoon session.

A paper by Dr. J. D. KELLY, of Lewis County, on "Ulceration of the Cervix Uteri," was then read by proxy, the author being detained by sickness in his family.

In common with most authors he regarded the term as a misnomer, the condition being hardly one of ulceration, but of erosion or abrasion. The true ulcer of the cervix was usually specific in its character. The cause of the condition was usually mechanical, the more frequent causes being retroversion, sub-involution, or laceration of the cervix. The correction of the mechanical disorder often was sufficient to cure the "ulceration," though some local applications were found useful. The points were illustrated by the history of several cases, and the present mode of treatment contrasted with the old-time physician's management, with his Ferguson's speculum and a piece of caustic in a goose-quill. The treatment will be indicated when a thorough knowledge of the condition of all the pelvic organs is secured.

Dr. ISAAC DE ZOUCHE, of Fulton County, read a paper on "The Treatment of the County Poor," in which he emphasised the necessity for administering charity judiciously, not to give indiscriminately; that while the worthy poor are cared for, their self-respect and mental independence are not undermined. Those who are poor through indolence should be made to work, it being remembered that the idle poor form a good recruiting-ground for the criminal class.

As complete classification in the poor-house should be organised as is possible, that the sexes may be separated, and the worthy poor relieved from contact with the idle or vicious. There should be arrangements for the separation of the sick from the well. In the Fulton County poor-house sufficient attention is not given to these principles of management, and the work of the attending physician is correspondingly unsatisfactory and discouraging. Then, again, the custom of paying a reduced fee to physicians for services to the poor is unjust. The physician pays taxes in common with other citizens, therefore this custom places a double tax upon him.

An obituary notice of Dr. Alexander Ayres was then read by Dr. S. H. French, and referred to the State Association for publication in the volume of transactions.

Adjourned one hour for dinner. On reassembling, the President read his address. (See following abstract.)

Dr. P. M. Dowd, of Oswego County, then read a paper on "The Relation of Bacteria to Disease." (See following abstract.)

Dr. W. H. Robb, of Montgomery County, then presented several cases of hip joint disease, treated by an elevated shoe on the sound limb, allowing the patient to go about on crutches. The results were very satisfactory. The discussion brought out the opinion that where the inflammation was severe, it would not do to discard the use of fixation apparatus for a time.

Dr. E. D. Ferguson read a paper on "The Relation of the Animal Alkaloids to Disease." The paper was a review of those alkaloids at present known, and having a probable relationship to disease as causative factors.

The Nominating Committee reported in favor of retaining the former Executive Committee, and it was so voted.

The Association then adjourned, to meet at Rome on the second Tuesday in July, 1889.

BYRON DeWITT, *President.*
EZRA GRAVES, *Secretary.*

Synopsis of an Address delivered before the First District Branch of the New York State Medical Association, July 10, 1888, by Byron DeWitt, M. D., of Oswego County, President.

The speaker said, in substance, that while casting about for a subject upon which to make remarks appropriate for this occasion, it had occurred to him that some theme of a general character would be more interesting, and perhaps more entertaining, than a detailed discussion of a particular disease or special branch of medicine or surgery, leaving those subjects for the papers and discussions which were to follow. He

said he would endeavor to avoid wearying those present with lengthy remarks upon the subject he had chosen, namely,

AN ERA OF PROGRESS.

His intention was rapidly to glance at a few of the numerous achievements in the arts and sciences of modern times, then to briefly sketch the progress made in the science of medicine and surgery during the same period, and finally hastily to compare their relative advancement. We could well afford to pause a moment in our busy lives to contemplate the vast and marvellous strides which had been made in professions beside our own. At the outset, we must acknowledge that other arts and sciences had vied with ours in the march of advancement. Daily, in the midst of the exacting duties of our lives, we passed unheeded wonders and triumphs of modern engineering and architectural skill. Steam and electricity had taken the place of the old packet boat, which required, within the speaker's recollection, a week to journey from Auburn to New York. Within fifty years it required ten days to secure an answer to a letter sent to New York, while now messages could be transmitted to the metropolis in a few minutes. In point of skill and grandeur the achievements of modern engineering compared most favorably with the works of ancient times. The Claudian Aqueduct, carrying 200,000,000 gallons of water daily to thirsty Rome; the famous walls encompassing the ancient city of Babylon, fourteen miles square, three hundred and thirty-five feet high, and eighty-five feet thick; and the wonderful pyramid of Ghizeh, seven hundred and sixty feet square at its base and four hundred and eighty-six feet high,—all have their superiors in modern times. The famous sewers of Paris, three hundred miles long; the Atlantic cable connecting the new and the old worlds; the stupendous St. Gothard tunnel, nine and one quarter miles long, piercing the Alpine ranges; the marine wonders, the Etruria and Umbria, which transport us from America to Europe in six days; and, finally, the greatest structure of either ancient or modern times,—for neither the hanging gardens of Semiramis, the temple of Diana at Ephesus, nor either of the so called seven wonders of the world, compare in grandeur or usefulness with the Brooklyn Bridge,—are all types of the triumphs of modern engineering skill. In architecture we find the comparison less flattering. St. Peter's Cathedral, the Versailles palace, the New Parliament Houses, or the Capitol of the Empire state would scarcely equal, either in artistic beauty or in magnificence of design, the Alhambra at Grenada, the Temple of Minerva, the Parthenon at Athens, or the wonderful Colosseum of Rome, capable of seating 87,000 people.

Turning to the field of invention, the speaker referred to the marvels of electricity, which have annihilated time and space; the discoveries of mechanism which have simplified and expedited our agricultural pur-

suits; and the multifarious applications of steam which have multiplied and broadened our fields of commerce and manufactures. After paying a merited compliment to Roebling and other famous men of modern arts and sciences, the speaker asked the question, What have medicine and surgery been doing meanwhile? While the engineer had been tunnelling mountains and blowing out the rocky bottom of Hell Gate with nitro-glycerine, the physician had added this powerful explosive to his already inexhaustible armament of materia-medica. By its use the dead had almost been raised, impending dissolution from heart-failure thwarted, and life prolonged beyond reasonable expectation. Like the nitrite of amyl, it has given instant relief from the fearful suffering of angina pectoris. Indeed, in all cases of heart-failure from arterial tension, which threatens to speedily terminate existence, we hope, we expect, and we get instantaneous relief from either of these remedies. The face flushes, the arteries throb, and with one bound of the heart the pain is gone. One of nature's most powerful forces, utilised in a score of ways for the advancement of commercial and manufacturing pursuits, has also been adopted by the medical profession. The very lightning which plays in the sky, like a docile creature, lies in the coils of the physician's pocket battery. By its aid features distorted with pain are exchanged for pleasant smiles. The hideous marks of naevi tumors and the morbid products of inflammatory action disappear by electrolytic decomposition. The deaf hear, the lame walk, and the chronic paralytic leaves his bed and resumes his work. Digressing for a short time, the speaker noticed some of the obstacles which have obstructed the path of advancement, giving particular attention to the quacks and public swindlers who thrive by liberal advertising of the most flagrant falsehoods. In England and Germany the people are protected against professional quacks by efficient laws, while feeble legislation in portions of the United States has only resulted in practically inoperative laws. Impositions of every kind and name form protective alliances, grant themselves licenses, and the tide of quackery rolls on. To remedy this, let us place the standard of education so high that quackery cannot reach the lower round of the ladder, and we shall have the line of demarcation clearly drawn. Obstructionists and sentimentalists had sought to interfere with the legitimate business of our profession in the advancement of knowledge and in the interest of suffering humanity. But vivisection has gone on, and the knowledge thus obtained is the heritage of a noble profession. Notwithstanding all difficulties and obstructions, the profession had made astonishing and rapid progress.

The speaker then reverted to his original theme,—the achievements made by the profession in modern times,—and said he would pass without comment the startling discoveries of Harvey and Jenner, because they were so well known to all, and pass to more recent times. Pathological

anatomy had brought to our knowledge many diseases which were before unknown and not suspected, and cleared up the mystery which surrounded others. He dwelt upon the valuable contributions to our materia-medica, and spoke at length upon the value of many new remedies and of the great improvement in the method of administering them, and noticed with care the great value of the hypodermic syringe. He referred to the great value of the microscope to the profession in the diagnosis of diseases, and also to the stethoscope, the laryngoscope, the ophthalmoscope, and the thermometer as useful aids in the diagnosis and treatment of diseases, and characterized the latter a beacon light which warns of dangerous places or betokens a clearing sky. Referring to surgery, he said we had the most striking evidence of improvement, but by no means the greatest discoveries. He spoke of the deformities which were now remedied by surgical operations and mechanical appliances, and of the great value of anaesthetics in grave surgical operations, and the comparative safety of such operations as ovariotomy, laparotomy, and lithotomy. Also to the astonishing results following these formidable operations in the hands of skilful surgeons, referring especially to the success of Dr. Keith and others. Lister's antiseptic method of treatment in these cases had no doubt considerably lessened the mortality, estimated by Dr. Keith at about ten per cent. It was quite possible that the absolute and perfect cleanliness now practised in all cases of surgical procedures, and universally recognised as an important factor in the successful treatment of all grave surgical operations, might have played as important a part in reducing the percentage of mortality in such cases as carbolic acid or bi-chloride of mercury. He spoke of the discussion had by Dr. Sayre and the late Dr. Frank H. Hamilton on fractures of the long bones, and said it all went to show what zeal there was in the profession to perfect the art of surgery. The antiseptic treatment of wounds was cited as another triumph of modern surgery. Formerly a partial union was hoped for by first intention in cases of amputation, thus shortening the time of final recovery. Now we expect to get complete union by first intention in nearly all cases of incised wounds, including amputations. No doubt all present had witnessed amputations of the leg, thigh, arm, and breast, antiseptically treated, where the union by first intention was complete, and scarcely a drop of pus had been discovered from the first to the final discharge of the patient. He spoke of the vast improvement in therapeutics, and illustrated the former and present methods of treatment of many diseases, showing the great superiority of the present over the old modes of treatment, and noticed the great value of chloroform, chloral, and the bromides in the treatment of the insane and in puerperal, epileptic, and other convulsive diseases. He regretted that time would not permit him to mention the many wonderful discoveries in the surgical field of the eye and ear, but one so recent and so

important deserved at least passing notice. He alluded to the engrafting of the cornea of the rabbit into the human eye—a wonderful triumph of ophthalmic surgery. By this operation those heretofore considered hopelessly blind from corneal opacity can be restored to sight. To Professor Von Hippel of Giessen belongs the credit of devising this operation.

In speaking of physical exploration of the chest, in diagnosis of diseases of the thorax, he said it had made our knowledge of the morbid conditions of the lungs, heart, and great blood-vessels about as clear as could be revealed by an autopsy. He said the physician had studied meteorology with reference to climatic influence upon health and disease, geology with reference to the connection between locality and endemic causes of diseases. From the field of botany new remedies without number had been selected. The science of chemistry had been carried almost to perfection in detecting the active principles of remedies. Mechanical arts had been brought into requisition to remedy defects of nature as well as sequelae of disease. The action of the lungs had been investigated in the light which had been thrown upon them by the laws of pneumatics and hydrostatics. The speaker regretted that he had been able to touch upon only a few of the achievements of the medical profession, and characterized it as a dignified, useful, and honorable calling, carrying comfort and relief in the hour of anguish to the rich and the poor alike. In conclusion, he spoke at length upon the necessity of earnest and united efforts on the part of the members of the medical profession in giving direetion to sanitary measures, and enlightening the public upon this important subject, and insisted upon the necessity of having intelligent persons only appointed as members of sanitary boards, and such only as would be fearless in the discharge of their public duties. He paid a high tribute of gratitude and respect to the late Drs. Samuel D. Gross, James P. White, and others for their early and earnest efforts to awaken the profession and the public to the momentous importance of the subject of Preventive Medicine. He said thousands of lives were saved in a single year by the adoption of vigorous sanitary measures, and instanced the grand results which had rewarded members of the profession for their efforts in Mobile and New Orleans during the pestilential year of 1873. He concluded by saying that it was in this direction that the profession of medicine had in the last quarter of a century made the most rapid progress and accomplished the greatest amount of good, and it was in this direction also that its grandest future lay.

Synopsis of a Paper by Pascal M. Dowd, M. D., of Oswego Co., on The Relation of Bacteria to Disease.

The paper gave a general description of bacteria,—their classification, conditions of growth, and multiplication, including the agents most useful in their destruction.

It has been found that the number introduced has much to do with the effects of inoculation, so that a certain effect—an abscess, or death—could be predicted according to the size of the dose of proteus vulgaris.

It is not yet proven whether or not bacteria cause suppuration, though they are frequently found in connection with suppuration.

It is not yet known whether bacteria or the animal alkaloids (ptomaines, leucomaines, &c.) are the poisonous agents and the cause of disease.

What has been found in regard to these micro-organisms may be of value in surgery, but in medicine the existence of bacilli is still a luxury of diagnosis, not an indication in the choice of treatment.

The gain thus far is hygienic rather than medicinal. This knowledge, incomplete as it is, must be of great value, as it enables us to perceive the direction in which we must exert our energies still farther to benefit the race in the diminution of infectious diseases.

There is probably no one who has thoroughly investigated the subject who does not to-day admit that a number of infectious diseases have been proven to depend upon specific micro-organisms, and that it is a logical inference that all infectious diseases are caused by parasitic organisms.

SECOND DISTRICT BRANCH.

The fourth annual meeting of the Second District Branch was held in Troy, June 26, 1888, in the Athenaeum Building.

ROBERT SELDEN, M. D., President, being in the chair, called the meeting to order at 10:30 o'clock A. M.

The minutes of the last meeting were read and adopted.

Dr. C. E. NICHOLS reported, for the Committee of Arrangements, that dinners for the guests would be furnished by the committee.

The following invited guests were by resolution invited to the privileges of the meeting:

Dr. A. Freiot.
Dr. S. Webster.
Dr. H. Wood.
Dr. L. B. Rulison.
Dr. Jos. Baynes.
Dr. Archambault.

Dr. W. W. SEYMOUR presented a case of alcoholic neuritis which had been under treatment for ten months. The patient had improved under the use of electricity so as to be able to work. Photographs of the man in different stages of the disease were exhibited.

The PRESIDENT read the Annual Address, presenting a report of cases of puerperal eclampsia, as occurring in his practice, which were treated by morphine hypodermatically, bleeding, and anaesthetics.

In discussing the paper, Dr. FERGUSON recommended the treatment of albuminuria by "milk diet."

Dr. SEYMOUR spoke of the danger in eclampsia of the delivery, and of the premonitory symptoms.

Dr. NICHOLS, discussing the treatment, urged the necessity of large doses of morphine crowded to narcotism.

The TREASURER's report was read and approved as follows:

Cash on hand from 1887,	$4.09	
Cash received from assessment,	14.50	
		$18.59
Paid balance printing, 1887,	$3.00	
Paid printing, 1888,	7.00	
Paid postage stamps and messenger,	5.05	
		$15.05
June 26, 1888. Balance in treasury,		$3.54

Dr. W. W. SEYMOUR then read a paper on "The Treatment of Pelvic Exudations and Abscess," referring to the surgical procedures by aspiration or opening and thorough drainage, or Hegar's method.

The subject was then discussed by Dr. A. H. VAN VRANKEN, who related a case which discharged into the uterus where the os uteri was very much contracted. Dilatation of the os was followed by a cessation of the profuse offensive discharge. Pregnancy followed, terminating in a miscarriage at the third month, and an apparent cure.

Dr. SABIN related a case in a young unmarried woman; the abscess opening through labia; right thigh retracted; the case terminating fatally.

Dr. W. W. SEYMOUR read an essay on "Some of the Manifestations of Diphtheritic Poison."

Dr. H. GORDINIER presented a man aged 27 years, with a history of syphilis, who was a subject of left hemiplegia, with hemianopsia on the temporal side of left eye and nasal side of right eye, and endarteritis without cardiac or renal complication; the patient having bulbar paralysis.

Dr. MARTINE read a paper on diphtheria, in which he advocated the treatment by alcohol and calomel.

Dr. H. E. VAN ZANDT, in discussing the subject, gave a history of an epidemic of diphtheria in Schenectady. He concluded that the disease was largely fatal under any form of treatment. In reply to question of direct contagion, he said that of 100 cases seen by him, 33 cases were supposed to be from direct contagion.

Dr. BONTECOU believed there was no specific treatment. He had treated some severe cases by keeping them, during the course of the disease, in the open air, the cases all recovering.

Farther discussion was made by Drs. FINDER and SABIN.

Dr. GORDINIER then read an essay on "Chronic Myelitis of Anterior Horns of the Spinal Cord." He also exhibited some sections of a diseased cord under the microscope.

Dr. E. D. FERGUSON then presented an interesting report of the present knowledge of the "Relation of the Animal Alkaloids to Disease."

This was commented on by Dr. MARTINE.

Dr. HARVIE read a report on "Intubation of the Larynx." He discussed the objections and difficulties of tracheotomy, and recommended the use of the tube in the early stages of the disease. He had found no difficulty from plugging of the tube. He advised rectal alimentation, and removing the tube every day for the purpose of giving nourishment. He had used the tube in ten cases, with two recoveries, all of a very unfavorable character. Relief in each case was decided, and was favorably judged by the friends of the patients.

Dr. FERGUSON said he had used the method in sixteen cases, and all

had terminated fatally. He differed from Dr. Harvie in the simplicity of placing the tube in position in very young children, and spoke of the necessity of first placing the forefinger on the opening of the larynx before passing the instrument.

Dr. Seymour had used the O'Dwyer method, and preferred it to tracheotomy. He thought that in the asphyxia of newly born children it would be a useful means of resuscitation.

Dr. C. C. Schuyler thought that dyspnoea was an indication for the operation; that where there was retraction of the intercostal spaces the patient would die in spite of the use of the tube, as this was an indication that the disease had passed below the larynx.

Dr. Finder said that in cases where he had not had the tube he had catheterized the larynx.

Dr. J. P. Marsh then read a paper on "Uterine Hydatids."

Dr. Ferguson moved that the present Executive Committee be continued, and that the Secretary cast a ballot for the branch. This was done, and the names of the Executive Committee were announced by the President.

Dr. Bontecou presented the case of a boy, injured in a railroad accident, whose skull was fractured, and the fractured portion was greatly depressed. After trephining, under strict antiseptic precautions, the depression was raised, and the cleansed button of bone was replaced and had become firmly attached, the wound healing without suppuration.

He also exhibited a man who, after eating heartily of beans, had obstruction of the bowels lasting thirteen days. The doctor made an abdominal incision, and found a constricting band near the ileo-caecal valve, which he cut. The difficulty was relieved, and the wound healed without suppuration.

Twenty-nine members registered and attended the meeting.

There being no farther business, the meeting adjourned.

ROBERT SELDEN, *President.*
C. H. BURBECK, *Secretary.*

THIRD DISTRICT BRANCH.

The fourth annual meeting of the Third District Branch was held at Norwich, June 21, 1888. The President, CHARLES W. BROWN, presented his address, selecting the subject of Aseptic and Antiseptic Surgery. He demonstrated that perfect cleanliness had much to do in producing asepsis. The sub-iodide of bismuth had supplanted the odorous iodoform. Fluoro-silicate of sodium is an unirritating salt coming into use in place of bi-chloride of mercury. One of the most important factors in the restoration of an injured part is heat. In injured parts, hot water is of greatest value to restore to normal conditions. After injury, place the patient in a room with temperature of eighty-six degrees, and apply hot water with flannels to injured parts. He applied hot water to amputation flaps until the surface was glazed, used catgut or horse-hair sutures, and then applied iodoform gauze and iodoform lint and suspended the stump. He reported cases of recent amputations treated by the above method with exceptional results.

Resolutions concerning the deaths of Dr. H. C. Hall, of Lisle, and Dr. Frederick Hyde, of Cortland, were adopted, and the Society directed that they be sent to the State Association with memorial sketches. The memoir of Dr. Hall was read by Dr. S. P. ALLEN, of Whitney's Point, and that of Dr. Hyde by Dr. CALEB GREEN, of Homer.

Dr. W. B. MORROW read a paper entitled "Marasmus." He reported three cases of the disease, two of which suffered at the same time with erythema nodosum. The concluding questions of the paper were,—First. Is erythema nodosum liable or likely to follow infantile atrophy? Second. May not too frequent bearing of children, other conditions being favorable, be a principal cause of marasmus?

Dr. ROBERT NEWMAN, of New York, read a paper on "Electrolysis," in which he demonstrated the various effects of the electrical currents at varying strengths. He also advocated its use in urethral and oesophageal strictures and in fibroid and other uterine tumors. Dr. Newman's paper was of the most interesting character, and the value of electrolysis was demonstrated by numerous experiments.

The next paper was entitled "Diagnosis and Treatment of Chronic Bright's Disease," by Dr. B. A. CHURCH, of Oneonta. He called attention to the vast importance of an early diagnosis in cases of chronic diffuse nephritis. The symptoms of pathological conditions were minutely described, and the paper called especial attention to the existence of a constitutional predisposition to the disease. He called attention also to

the fact of the early cardiac hypertrophy occurring in this class of cases, the hypertrophy occurring in many instances before the recognition of the kidney lesion. He described the deposits of material producing the condition known as arterio-capillary fibrosis. The conclusion of the paper was, that the disease was the result of a widespread tissue degeneration involving many or all organs, coincident with the kidney disease.

The next paper considered the subject, "Shall Surgical Instruments be Patented?" and was presented by Dr. T. H. Squire, of Elmira. It was claimed that they should be patented, because,—First. A patent would not keep new ideas from the profession, but publish them in a clear light, and offer them as quickly as possible for acceptance. Second. The desire for a patent was not the result of a mercenary disposition, but a desire for legitimate remuneration, the same as an author received in return for his intellectual labors. Inventions were often the result of days and months of labor and thought. If the medical profession were more fair and liberal toward their inventive brethren, there would be a greater inventive effort and an improvement of our instruments. The author therefore advocated the elimination of the words "surgical instrument" in Article 1, Section 5, of Part 3 of the Code of Ethics.

Dr. N. S. Jacobson, of Syracuse, presented a paper on "Tracheotomy in Croup." Dyspnoea from catarrhal croup is usually of nocturnal occurrence, is relieved by steam, and does not call for tracheotomy. He disregarded the question of the identity of membranous and diphtheritic croup, inasmuch as it is the mechanical obstruction and not the pathological condition in which we are interested. Given a case of croup that does not yield to medicinal treatment, with aphonia, respiratory sounds prolonged, laryngeal stridor, suffocation, labored respiration, great restlessness, etc., what have we to gain by longer delaying the operative procedure? Mackenzie suggests that ten per cent. of such cases recover unoperated. The author regarded the statement as generous, for while he had seen a few cases recover, they generally go on to heart-failure and death.

At what period should we operate? Is it not cruel and unwise to wait until the third stage, when the patient is exhausted, the heart weak, lungs engorged, and the neck in a state of venous congestion? We should operate early. Renault tells us that in Parisian hospitals surgeons are governed in their decision concerning an operation by the degree of permanent stridor, rather than by the frequency or severity of the suffocative spells. If there has been progressive laryngeal stridor for from twelve to twenty-four hours, the operation is indicated. In Germany the opposite rule holds good, and the practice is more as it is in America. The difficulties of close attendance in private families make the importance of an early operation greater than it would be in hospital practice If pharyngeal diphtheria has preceded the laryngeal invasion several days,

and the constitutional infection exists, it makes the necessity of an early operation greater, and the surgeon should operate as soon as he is satisfied that the ordinary remedies are of no avail in controlling the disease. It is labored, not rapid, breathing that tracheotomy relieves, except when the laryngeal disease has slowly supervened upon the pharyngeal implication. In such instances should the respiration exceed fifty per minute and the temperature and pulse be correspondingly high, some pulmonary implication should be feared. Extreme youth is not a contraindication. Winter reports ninety-three successful cases under two years old. The operation should not be cast aside in infants, though it is more successful between the ages of five and eight years. Croup, secondary to measles or scarlatina, is not necessarily a contraindication. The author had operated in such instances three times with one successful result. Millard reports three successful cases, Sanne four, Pilcher one. Broncho or croupous pneumonia and oedema of the lungs are not necessarily contraindications, and successful results are reported after operation in such conditions. A contraindication would be the simultaneous existence of malignant diphtheria. Poor and unsanitary surroundings should not deter us. In describing the method of operation, the author advised the use of chloroform, but the anaesthesia should not be carried to a point of tracheal insensibility to the presence of blood and mucus. He made an incision, not less than an inch downward, beginning at the central prominent tuberosity of the cricoid. The bistoury should be substituted for the scalpel as soon as the skin was divided. Haemorrhage having been arrested, the trachea should be opened with the point of the knife upward, the three-bladed dilator introduced, and the trachea cleared of all foreign substances by a catheter attached to a bulb syringe or spray, if needed, and the tube then introduced. The air should be saturated with steam. The author reported 22 tracheotomies,—17 for acute pharyngeal disease; 2 for laryngeal syphilis; 1 for removal of foreign body from the larynx; 1 for naso-pharyngeal tumor; 1 for impaction of a bean in the bronchi. The latter 5 all recovered. Of the 17, five recovered. Nine had pharyngeal diphtheria; in 3 the laryngeal disease was secondary to measles; 5 were uncomplicated laryngeal diphtheria. Youngest operated on, 14, 17, 23, 24, months. One was three, 4 were five, 1 was six, 3 seven, 1 eight, 1 nine, and 1 ten years.

Causes of Death: 1 cardiac paralysis; 3 pulmonary oedema, 1 cholera infantum, 1 meningitis, 1 high temperature, 1 cellulitis, 1 exhaustion, 1 diphtheritic paralysis; and 1 uraemic poisoning.

He had used the O'Dwyer's tube twice, and in each instance the tube had become quickly obstructed and the removal demanded. Recent reports showed that of 800 intubations by 65 different physicians, 221 or 27.4 per cent. recovered. In 505 fatal cases, the causes of death were stated in 339;—55 pneumonia; 37 sepsis; 39 exhaustion; 25 nephritis; 20

heart-failure; 9 oedema; 7 bronchitis; 2 asphyxia from plugging the tube; 2 from membrane above; and 4 from coughing out the tube. The operations were not rivals, but helpmeets.

Dr. H. D. Elsner presented a paper entitled "Fistula in Ano dependent on Tuberculosis of the Ischio-Rectal Fossa." The discovery of Koch, that all forms of tuberculosis depended upon the same bacillus, had revolutionised our ideas of certain forms of local tuberculosis. Some ischio-rectal abscesses might be non-tubercular, but others were the result of a general tuberculosis, and still others of a primary local tuberculous disturbance. Many of these cases developed pulmonary consumption, or had already latent tubercular deposits in the lungs or other organs. Celsus called attention to the fact that some fistulae healed easily, while others did not heal at all or were prone to recur. Jean Louis Petit first observed the relationship of fistulae in ano to pulmonary consumption, and taught that if the fistulae were closed the pulmonary disease became more serious. Heurteloup established fistulae in consumption as a remedial measure. Many have denied the connection between phthisis and fistulae. Bodenhamer had reported 960 cases, 73 of which had phthisis. 55 of the latter were the result of the phthisis. Allingham recorded 1,632 cases, of which 234 had phthisis, either active or latent.

The deductions of the paper were, that the modern treatment of local tuberculosis is identical with that accepted for the cure of malignant new growths, *i. e.*, a complete removal of all the affected tissue under aseptic precautions. That tuberculosis could be cured was an established fact. In advanced cases of phthisis it would not be advisable to close the fistulae, nor in acute miliary tuberculosis. In all cases the sphincter muscle should not be interfered with, but all the tissue possible and all old granulations should be removed by scooping and other means.

Dr. A. H. Goelet, of New York, read, by invitation, a paper entitled "Dilatation of the Cervix Uteri versus Divulsion." Moderate dilatation, if maintained by proper use of the stem, was sufficient for all conditions of constriction of the cervical canal. Divulsion was a dangerous operation, and unnecessary. A prominent surgeon had said that he would as soon use dynamite in the male urethra as the divulsor. If it were to be condemned there, why should it not also be condemned for use in the cervical canal? Authorities admitted the danger of divulsion, and that many cases were but temporarily benefited. We could not obtain permanent results from divulsion without suitable after treatment to maintain it. In the urethra gradual dilatation was effective, but owing to difference in the tissues it was not so in stenosis of the uterine canal. In addition to the stenosis, the constriction was increased by the engorgement and weight of the uterus. Dilatation alone would not relieve this nor straighten the canal, and divulsion could only increase the congestion. To relieve a constriction of the cervical canal, therefore, we should dilate and maintain

the dilatation, and we should also correct the abnormal curve in the canal and remove the thickened lining membrane. Dilatation should be sufficiently done under an anaesthetic, operating slowly, using no unnecessary force, then a straight stem introduced, of sufficient size to be grasped by the constricting fibres remaining after dilatation, the size of the stem increased as the constriction relaxed, and the patient kept prone in bed. The stem maintained and increased the dilatation produced by the dilator, straightened the canal, and removed hypertrophy by constant and increasing pressure, and if properly cannulated encouraged drainage. The results of treatment were illustrated by a rubber tube stretched over a hard substance larger than its size. The uterine cavity would contract after the described treatment, but not to its original calibre. It was of great importance, in doing the operation, to attend to the minutest detail. The stem must be passed through the internal os and kept there by a properly adjusted tampon, the cup of the stem hugging the cervix closely. The tampon and stem should be removed every day, and the strictest antiseptic rules observed. In introducing the stem a Sims's speculum and an angular tenaculum, as well as a properly constructed applicator, should be used.

Dr. H. D. Didama read a paper on the "Aetiological Treatment of Convulsions." Convulsions should be treated by tracing out the cause, and removing that. The paper was illustrated by reports of cases showing the various causes of convulsions, and the results of treatment based upon the plan suggested.

Dr. L. J. Brooks gave a description of an epidemic of cerebro-spinal meningitis occurring in Norwich and vicinity during the spring of 1888. One hundred and twelve cases were reported, not including those of the abortive type. Twenty-four were of the fulminating type. Norwich had 70 cases with 23 deaths; No. Norwich, 18 cases with 3 deaths; Plymouth, 16 cases with 5 deaths; Oxford, 12 cases with 4 deaths. The symptoms presenting themselves were analysed, and the disease shown to be genuine epidemic cerebro-spinal meningitis. The paper also demonstrated the fact that the new cases invariably occurred at the time of breaking up of the weather, following extreme cold. It was also shown that the local sanitary condition influenced the localisation of the disease, which prevailed more abundantly in the part of the town where the most unsanitary conditions existed, while there were comparatively few cases of it in sections where the reverse existed.

The paper was followed by one presented by Dr. E. S. Lyman, of Sherburne, describing an epidemic of the same disease occurring in Sherburne and vicinity in the year 1860. There were about 80 cases, and about the same proportion of deaths.

This paper was followed by one on "The Treatment of Cerebro-Spinal Meningitis," by Dr. B. J. Ormsby, of Norwich. In the absence

of a settled aetiology, he advised the treatment applicable to all epidemic diseases, *i. e.*, personal cleanliness, the purification of localities, and, as far as possible, the isolation of patients. Such so called preventives as quinine and whiskey lessened the resistance to the disease. As soon as the initial symptoms showed themselves, a thorough derivation to the skin should be induced by hot baths or other methods. Ice or iced cloths might be placed on the head and iced drinks given, with a hypodermic injection of morphia if the pain were severe. Remedies that ordinarily depress the temperature should not be used. Derivation to the intestinal tract by a prompt cathartic or free enemas was indicated. Stimulants were improper unless typhoid symptoms supervened. Quinine had no specific nor antipyretic action in this disease. The earlier treatment should be followed by morphia in generous doses. Bromides might be tried, but not with the expectation of a specific result. He would recommend as a counter-irritant Squibb's 20 per cent. oleate of mercury. The patient should be thoroughly nourished.

These papers were discussed by Dr. W. E. FORD, of Utica, Drs. JACOBSON, BROOKS, LYMAN, and others.

Dr. G. O. WILLIAMS, of Greene, presented, by invitation, a paper on "Sycosis Non-Parasitica." He reported two cases, both severe in type and extent. The usual method of treatment availed nothing. The treatment adopted was,—first, clipping the beard to about $\frac{1}{4}$ inch; second, depilation was practised, and when the pustules were mature they were well emptied; third, $\frac{1}{2}$ grain doses of sulphide of calcium; fourth, poultices of ulmus containing to each ounce one drachm of oil of gaultheria, and three drachms of glycerine. The result was an immediate relief and a permanent cure.

The meeting then adjourned to meet at Cortland, Cortland County, at the stated time in 1889.

A banquet was held in the evening.

CHARLES W. BROWN, *President.*
LEROY J. BROOKS, *Secretary.*

MEETINGS OF THE EXECUTIVE COMMITTEE OF THE THIRD DISTRICT BRANCH OF THE STATE MEDICAL ASSOCIATION, HELD AT NORWICH, APRIL 17 AND JUNE 19, 1888.

Present: Charles W. Brown, M. D., Chemung County; A. M. Fitch, M. D., Tompkins County; Elias Lester, M. D., Seneca County; O. W. Burhyte, M. D., Madison County; G. W. Avery, M. D., Chenango County.

On motion of Dr. G. W. AVERY, an assessment of seventy cents on each member was ordered, to meet the estimated expense of the annual meeting. A communication was presented from Dr. ELY VAN DEWARKER, ask-

ing that the resolution of the Association, making the papers presented the exclusive property of the Association, be rescinded. The subject was discussed, and a resolution offered and passed sustaining the previous resolution.

A communication was presented from the *Philadelphia Medical Times* concerning the publication of the Proceedings of the meeting and furnishing reprints. Also from the *New York Medical Journal* on the same subject. The subject was referred to the general meeting, and Elias Lester, Nathan Jacobson, and H. C. Lyman appointed to consider the subject.

The following committees were also appointed:

Arrangements,—G. W. Avery, S. M. Hand, H. C. Lyman, B. J. Ormsby, T. G. Packer.

Registration,—S. M. Hand, T. G. Packer, H. M. Farrington. On the deaths of Frederick Hyde and H. C. Hall, G. W. Avery, Elias Lester, and H. M. Hand were appointed a committee.

Adjourned.

LEROY J. BROOKS, *Secretary*.

FOURTH DISTRICT BRANCH.

The fourth annual meeting was held at The Genesee, Buffalo, on May 8, 1888.

The meeting was called to order at 10 o'clock A. M. by President CRONYN.

The minutes of a preliminary meeting of the Executive Committee were read by the Secretary, and approved.

The PRESIDENT stated that owing to his recent severe illness, from which he had not then fully recovered, he had not been able to prepare an address for the meeting. He then spoke briefly concerning the treatment of diphtheria, condemning most strongly all local applications. He referred to the investigations of Oertel, which demonstrated the softened condition of all the tissues of the body, especially the heart, after death from diphtheria. He recommended tonic and stimulant treatment. He had found better results from the use of a solution of chlorate of potash, muriate of ammonia, and tincture of muriate of iron, with glycerine and water, than from any other drugs.

Farther remarks were made upon the subject by Drs. HOYER and BERRY.

The report of the Treasurer was then read, showing receipts of $31.00, expenditures of $16.73, leaving a balance of $14.27 in the treasury.

Upon motion of Dr. ANDREWS, the report of the Treasurer was accepted.

The Committee of Arrangements reported that they had decided to levy an assessment of 50 cts. per member to pay the annual expenses.

Dr. J. B. ANDREWS, of Buffalo, read a paper upon "Psychical Research."

The paper was discussed by Dr. M. WILLOUGHBY, present by invitation.

Dr. GEO. E. FELL, of Buffalo, read a paper upon "Forced Respiration," and presented three gentlemen whose lives had been saved by this method of treatment.

Dr. C. H. WOODWARD, of Batavia, read a paper on "Diphtheritic Paralysis."

The paper was discussed by Drs. HUBBELL and CRONYN.

Dr. A. A. HUBBELL read a paper upon "The Removal of Iron from the Interior of the Eye," which was discussed by Dr. ABBOTT, present by invitation.

Upon motion of Dr. HUBBELL, it was voted that the Executive Committee hold over another year.

The meeting then adjourned to meet at Rochester on the second Tuesday in May, 1889.

J. CRONYN, *President.*
W. H. THORNTON, *Secretary.*

FIFTH DISTRICT BRANCH.

SPECIAL MEETING.

The fifth special meeting of the Fifth District Branch was held in the Pavilion Hotel, New Brighton, Staten Island, on Tuesday, November 15, 1887. Meeting called to order by the President, Dr. EDWIN BARNES, at 1.30 P. M.

The SECRETARY announced that Drs. Govan and Purple had been appointed to act with the Secretary as Registration Committee.

The scientific business was at once taken up.

Dr. A. L. CARROLL opened with his "Remarks on the Clinical Significance of Sphymographic Tracings." His remarks were abundantly illustrated with several forms of sphymograph, and tracings of the normal and pathological conditions of the heart. Discussed by Drs. GOULEY, TRUAX, LEALE, WALSER, GARRISH, and the author.

Dr. W. C. WALSER's paper was next taken up,—"Chronic Progressive Caries of the Bones of the Foot,"—with cases, and presentation of a patient. The patient presented was examined, and the case was discussed by Drs. LEALE, GOULEY, CARROLL, and the author. Dr. LEALE made the request that, inasmuch as this case was an anomalous one, Dr. Walser obtain casts of the patient's feet and present the same to the museum of the State Association.

Dr. S. H. BENTON then read his paper on "Antithermics in Neuralgic Pains." Discussed by the PRESIDENT, and Drs. PORTER, GARRISH, WALSER, ROCHESTER, BIERWIRTH, E. R. SQUIBB, MCCOLLOM, and TRUAX.

Dr. A. L. CARROLL next gave his "Demonstration of a Dressing for Green-Stick Fracture of the Clavicle" on a laboring man, present for the occasion. Considerable interest was shown in this simple but effective dressing, and the subject was discussed by Drs. GOULEY, NEWMAN, LEALE, ROCHESTER, and CARROLL.

On account of the lateness of the hour, the PRESIDENT desired to have his paper—"The Individuality of Disease"—read by title. There being no presentation of specimens nor voluntary communications, a motion was made and carried that the meeting go into executive session.

The SECRETARY read the minutes of the last meeting, which were approved.

The report of the Executive Committee was read, and, upon being put to vote, it was unanimously adopted.

The SECRETARY then made the official announcement of the deaths of

three of the Fellows of this Branch since the last meeting,—Drs. Alonzo Clark, Joseph C. Hutchinson, and Jared Linsly; the two latter being among the Founders of this Association.

The motion was now made that the remainder of the session take the form of a memorial meeting, out of respect to our three recently departed Fellows. Carried.

Dr. John Shrady opened the meeting by reading a memorial of Dr. Alonzo Clark.

Dr. S. T. Hubbard followed with a memorial of Dr. Jared Linsly, at the close of which he offered the following resolutions, which were unanimously carried:

Whereas, It has pleased the Almighty in His infinite wisdom to remove from our midst our associate and esteemed friend,—therefore be it

Resolved, That in the death of Dr. Jared Linsly the medical profession, and this Branch of the State Medical Association, have been deprived of one of their ablest and wisest members, one of their firmest friends, and one who won the respect and esteem of all who knew him.

Resolved, That we tender our deepest sympathy to the bereaved family in their affliction.

Resolved, That a copy of this minute, signed by the Chairman and Secretary, be sent to the family of the deceased.

The Secretary here stated that Dr. Alexander Hutchins, although not a Fellow of this Association, had been invited to contribute to this meeting, and that he had accepted. He wrote that he should not be able to be present, but sent his remarks on Dr. J. C. Hutchinson with a grateful acknowledgment of thanks for the opportunity thus afforded him of expressing his regard and esteem for Dr. Hutchinson. It was expected that Drs. Rushmore, Segur, Wyckoff, and others would be present to offer their remarks on Dr. Hutchinson; but as they had apparently been detained, the Secretary now moved that any remarks received by him after the meeting be accepted and referred to the Committee on Necrology, together with the remarks here made. Carried. Dr. T. M. Lloyd, not present, sent the following note:

It is with much gratification that I have heard (at the Kings Co. Med. Assoc.) the happily expressed encomium and just estimation of the late Dr. Jos. C. Hutchinson, by Dr. J. D. Rushmore, and I can only add emphasis to the representative character of Dr. Hutchinson as a man and a surgeon, and attest to the love and regard ever accorded him by the community and his professional associates.

I will offer, in this connection, the following resolutions, not heretofore published, adopted by the medical board of St. Peter's Hospital, Brooklyn, with which Dr. Hutchinson was associated as consulting surgeon:

That, Whereas, Dr. Joseph C. Hutchinson, late consulting surgeon of St. Peter's Hospital, was closely identified with the organisation of the present board and with the administration of its interests throughout its existence;

And, WHEREAS, Almighty God, in His infinite wisdom, has removed our honored colleague from our midst,—

Therefore, *Resolved*, That we tender his family our heartfelt sympathy in their deep affliction; and express our appreciation of his rare gifts and attainments, and our deep sense of the loss to the Hospital of a wise counsellor, to our profession of an honorable standard-bearer, and to the world of a Christian gentleman.

(Signed) J. E. CLARK, M. D., *President.*
T. M. LLOYD, M. D., *Secretary.*

Dr. ELLSWORTH ELIOT next paid farther tribute to the memory of Dr. Alonzo Clark in some extended and interesting remarks on his life and the operations performed by him.

Dr. J. W. S. GOULEY also contributed some remarks on Drs. Clark and Hutchinson, as well as on Dr. Frederick Hyde, our late Fellow and founder, of Cortland, N. Y., recently deceased.

The Secretary then stated that Drs. B. W. M'Cready and C. L. Mitchell, both associates of Dr. Clark, had been invited to contribute to this occasion, but had written that it would be impossible for them to attend, although in entire sympathy with the Branch on this subject. Dr. M'Cready mentioned several steps in the life of Dr. Clark, brought out more fully in the remarks already made.

Dr. Abram Dubois also wrote the Secretary that "physical infirmities" would prevent his attendance, and regretted exceedingly that he could not furnish something "worthy of the object of this meeting."

There being no farther business, the meeting adjourned at 4:20 P. M. The Register showed 25 Fellows and 4 visitors present.

E. H. SQUIBB, *Secretary.*

FOURTH ANNUAL MEETING.

The fourth annual meeting of this Branch was held in Brooklyn, in the Magnolia Lodge Rooms, on Tuesday, May 22, 1888. The morning session was called to order by the President, Dr. EDWIN BARNES, at 11:25 A. M. The Secretary read the minutes of the last meeting, which were approved; also the report of the Committee of Arrangements for this annual meeting, which was accepted and adopted. The Secretary announced that Drs. F. U. Johnston and Milton C. Conner had been appointed to act with the Secretary as Registration Committee. The President then read his annual address, which was ordered to be published, as provided for by the Executive Committee. Reports of delegates were called for, but the Secretary stated that there were none this year. The annual report of the Executive Committee was next read as follows:

The Executive Committee beg leave to report that there have been three meetings during the year—one simply to elect a Secretary for the year just past, one special meeting, and the third, the annual meeting.

In regard to the funds of the Branch, as shown by the Treasurer's report, there was in the Treasury Fund, January 2, 1888, $84.19, with outstanding debts at the present time to the amount of $17.75. The minutes of the Executive Committee meetings for the year are as follows:

(See page 518.)

Before action was taken on this report the subject of the Branch Permanent Fund, introduced by the Committee, was discussed by Drs. TRUAX, PORTER, the President, and the Secretary. It was finally resolved to state in the printed circular to be sent out for voluntary contributions to this proposed Permanent Fund, that the sums contributed were conditional on being able to raise the required total sum for such expected investment as would put the fund on a permanent basis. This amendment being accepted, the report was approved. On motion of the Secretary, the order of business was suspended, in order to allow Dr. J. LEWIS SMITH to read his paper on "Diphtheria of the Newborn and Sepsis of the Newborn, as observed in the New York Infant Asylum and New York Foundling Asylum."

Discussed by Drs. E. R. SQUIBB, RISCH, and the author.

The regular order of business was then resumed by the reading of the Treasurer's annual report, which was accepted.

Reports of special committees were called for, but there were none.

Under the head of Unfinished Business, the Secretary reported that on November 19, 1887, he had sent, as directed, a copy of the minutes on the late Dr. Jared Linsly to the family of the deceased. Also, shortly after the memorial meeting, at New Brighton, he had received some remarks on the late Dr. J. C. Hutchinson, by T. M. Rochester, M. D., which, according to the instructions of the meeting, were referred to the Committee on Necrology. There was no new business.

The PRESIDENT then announced that a Nominating Committee would now be chosen to elect an Executive Committee for the ensuing year.

The SECRETARY called off the counties of the district, and Fellows from those counties present appointed the following Nominating Committee:

For Dutchess County, Dr. Porteous.
Kings County, Dr. Vanderveer.
New York County, Dr. Porter.
Orange County, Dr. Conner.
Putnam County (none present).
Queens County, " "
Richmond County, Dr. Johnston.
Rockland County (none present).
Suffolk County, " "
Sullivan County, " "
Ulster County, Dr. Van Hoevenberg.
Westchester County, Dr. Southworth.

The Secretary reminded the Nominating Committee that they were expected to meet during the intermission between the morning and afternoon sessions.

Dr. T. H. Allen not being present to read his paper, the morning session adjourned at 1 : 05 P. M., to meet at 2 P. M.

The afternoon session was called to order by the President, Dr. BARNES, at 2 : 30 P. M. The scientific business was immediately taken up. A discussion of "Surgical Aid in the Treatment of Pulmonary Disease" was introduced, with a paper by Dr. N. L. NORTH, in which he propounded the following questions:

First—Can surgery be made available in the treatment of pneumonia or other acute affections of the lungs? and, if so, how?

Second—Can surgery assist in the treatment of abscess of the lung? and what is the safest and most effectual mode of reaching, evacuating, and draining the abscess?

Third—What surgical process, if any, can help in the treatment of laryngeal phthisis?

Fourth—Can surgery be made effectual in draining tubercular cavities? and, if so, how?

Fifth—Is it possible by surgical process to reach and destroy, by antiseptics, germicides, or otherwise, the bacillus tuberculosis, or whatever is the cause of phthisis pulmonalis?

The discussion was continued by papers from Drs. J. D. BRYANT, C. A. LEALE, AVERY SEGUR, and C. S. WOOD, all of which were ordered to be published as provided for by the Executive Committee. The discussion then became general. The Secretary stated that Dr. Jos. E. Clark, of Brooklyn, who had had some practical experience in this subject in St. Peter's Hospital, in this city, had been invited to favor the Branch with his notes. Upon being called for, he was found to be absent. The general discussion was continued by Drs. TRUAX, MCCOLLOM, SEGUR, BIERWIRTH, LEALE, WOOD, E. R. SQUIBB, and the Chair, and closed by Dr. NORTH.

The report of the Nominating Committee was then called for. No formal report was made, but Dr. PORTER, in behalf of the Committee, made the following verbal report:

For members of the Executive Committee to represent

Dutchess County, Dr. J. G. Porteous.
Kings County, Dr. Wm. McCollom.
New York County, Dr. J. G. Truax.
Orange County, Dr. W. B. Eager.
Putnam County, Dr. Wm. Young.
Queens County, Dr. Edwin Webb.
Richmond County, Dr. F. U. Johnston.

Rockland County, Dr. Wm. Govan.
Suffolk County, Dr. W. D. Woodend.
Sullivan County, Dr. T. W. Bennett.
Ulster County, Dr. H. Van Hoevenberg.
Westchester County, Dr. N. C. Husted.

It was moved and seconded that the report be accepted and approved, and the Committee be discharged. Carried.

After the PRESIDENT had called for a meeting of the newly elected Executive Committee immediately after adjournment, the meeting adjourned at 5 P. M.

The Register showed 41 Fellows and 1 visitor present.

E. H. SQIUBB, *Secretary.*

SIXTH SPECIAL MEETING.

The sixth special meeting of the Fifth District Branch was held in a private hall at Babylon, Long Island, on Tuesday, July 31, 1888. The meeting was called to order in open session by the President, Dr. EDWIN BARNES, at 2:30 P. M. The SECRETARY announced that Drs. LEIGHTON and McCOLLOM had been appointed to act with the Secretary as Registration Committee.

The reading of the scientific papers was at once taken up. Dr. J. G. TRUAX began with his paper on "Heart Lesions and Albuminuria: are they only blood relations?"

Discussed by Drs. S. T. HUBBARD, SULLIVAN, GARRISH, and the author.

Dr. WM. GOVAN followed with the account of a case of "The Removal of a Tumor from the Internal Os, enclosed in a Membranous Sac."

Discussed by Drs. NEWMAN, SULLIVAN, TRUAX, and the author.

Under the head of Voluntary Communications, Dr. J. G. TRUAX related a case, somewhat in detail, very similar to that of Dr. GOVAN.

The SECRETARY then read, by request, the report of a "Case of Ruptured Diaphragm and Death by Apnoea—the Stomach and Spleen occupying the left Thorax," by N. W. LEIGHTON, M. D. Discussed by Dr. NEWMAN and the author.

The SECRETARY announced that we had hoped to hear a full report of a case of hydrophobia treated at the Brooklyn Hospital last winter; but as the post-mortem examination of the cord had not been quite completed, it was thought best to await the full particulars, which it is expected will be reported at a future meeting.

A motion that the meeting go into executive session being carried, the SECRETARY read the minutes of the last meeting, which were adopted. The report of the Executive Committee was then read, and, after some little discussion and remarks in the way of explanation in regard to the Permanent Fund scheme, the report was adopted.

The SECRETARY stated that he had received the programme for the fourth annual meeting of the Third District Branch, to be held at Norwich on June 21st last. There were twenty interesting papers announced.

Also the programme for the fourth annual meeting of the First District Branch, to be held in Amsterdam on July 10th last. There were eight papers announced, beside the PRESIDENT'S address and volunteer papers.

There being no farther business, the meeting adjourned at 3 : 45 P. M.

The Register showed 16 Fellows and 4 visitors present.

E. H. SQUIBB, *Secretary.*

ABSTRACT OF PAPERS.

First Paper: Dr. TRUAX retained his paper, to be added to and presented to the State Association in the fall. He desired nothing should be published now.

Second Paper: Dr. GOVAN'S. The case related was that of a middle-aged married lady, the mother of six children, long confined to bed with almost constant flooding, and latterly a tumor had protruded from the vulva, which had been pushed back by a previously attending physician. She improved somewhat under medicaments given at this time. The patient then desiring to have the tumor removed at all hazards, it was undertaken. A mixture of chloroform and ether was used to anaesthetise the patient. The tumor was found to be the size of a child's head at birth, and to be attached by a pedicle, quite high up, to the os. An incision was made with a serrated spoon as high up as possible, and an écraseur then used. Finally, a hard substance about the size and shape of a large turnip rolled out of a membranous sac, with a large quantity of fluid. After complete excision of the sac, the vagina was plugged with small sponges saturated with solution of subsulphate of iron. The patient rapidly improved under tonics and good nursing, and is now able to do her ordinary housework, and even travel some distance from home.

Third Paper: Dr. LEIGHTON'S case of "Ruptured Diaphragm and Death by Apnoea—the Stomach and Spleen occupying the left Thorax." A married lady of 28 years of age, with severe pain in the epigastrium, nausea, and dyspnoea. Symptoms pointed to a case of colic, brought on by a meal shortly before, during which scallops were eaten. Powdered ipecac in warm water was prescribed, but swallowing was found to be impossible. Other medicaments were tried, but were of no avail. Death occurred in less than half an hour. A post-mortem was obtained after considerable persuasion, about twenty-one hours after death. An opening was found in the diaphragm through which the stomach and spleen had entered the left thoracic cavity. The stomach was distended with gas and partially digested food. The edges of the ruptured diaphragm were thickened and rounded as if they had healed a long time before. Upon questioning the husband, the only cause for this old rupture was that she had had a very severe labor some seven years before with the sensation then expressed of something having given way.

PROCEEDINGS OF THE EXECUTIVE COMMITTEE, FIFTH DISTRICT BRANCH.

A meeting of the Executive Committee was held on the Staten Island boat leaving Whitehall at 12:10 P. M., Tuesday, November 15, 1887. Meeting called to order by the President, Dr. EDWIN BARNES, at 12:15 P. M.

Present: Drs. EDWIN BARNES, WM. GOVAN, WM. MCCOLLOM, P. B. PORTER, E. H. SQUIBB.

The SECRETARY read the Minutes of the last two meetings, which were accepted and adopted.

The report of the Committee of Arrangements for the present meeting was called for, but they made no formal report.

The PRESIDENT then appointed Drs. GOVAN and PURPLE to act with the Secretary as Registration Committee.

The SECRETARY next read letters from Drs. T. W. Bennett and Edwin Webb, explaining their apparent neglect in attending meetings; also a letter from Mr. J. H. Linsly concerning the estate of his father, Dr. Jared Linsly; and one from Dr. Alexander Hutchins accepting an invitation to write some remarks on the late Dr. J. C. Hutchinson.

The SECRETARY called the attention of the Committee to the list of persons he had appealed to to contribute to the memorial part of the meeting. The Secretary, as the Committee of One, appointed at the last meeting to decide upon a suitable journal for the publication of our papers, reported that no progress had been made in obtaining any other journal than Gaillard's. In correspondence with its editor, now retired, it was found that the journal would still be carried on with the same policy, and that it was the desire of the publisher to continue to publish the Branch papers. After some expressions on the part of members of the committee, it was unanimously resolved to continue the publication in "Gaillard's Medical Journal" until farther ordered by this Committee.

The Committee on this Special Meeting then made its report as follows:

Your Committee appointed at your last meeting begs leave to report that, after having carried on some correspondence on the subject, it finally met at the Hotel Brunswick, New York city, on September 28, 1887, and after some preliminary discussion, it was finally decided to meet in Richmond County, on Tuesday, November 8, 1887; and accordingly, on October 4th the following resolution was sent out to each member of the Executive Committee to be voted on:

BROOKLYN, October 4, 1887.

WHEREAS, Your "Committee on the date and place of the next Special Meeting" of the Branch has decided upon Tuesday, November 8, 1887, to meet in Richmond Co., it begs leave to offer the following resolution:

Resolved, That the above date and section be confirmed, and that the exact locality and the time of day for the session be left in the hands of the following Committee of Arrangements:

Drs. F. U. Johnston, *Chairman*, A. L. Carroll, W. C. Walser.

Respectfully submitted,

W. D. WOODEND, M. D.,
E. H. SQUIBB, M. D.,
Committee.

The Secretary subsequently sent out the following postal-card to each member of the Executive Committee:

October 6, 1887.

The President has just called attention to the fact that the date November 8th, which you have just been asked to vote upon for our next special meeting, is Election Day. The undersigned would therefore now propose that the date be changed to Tuesday, November 15. Should he not hear from you to the contrary by October 15, he will consider the new date approved of.

Yours respectfully,

E. H. SQUIBB, *Secretary.*

Accepted and approved.

The subject of the next special meeting was next brought up. The SECRETARY read the correspondence he had had with Dr. W. B. Eager in regard to meeting next in Orange Co. After some discussion it was resolved that it would be unadvisable to meet anywhere in the country in the winter months, and that the next meeting should be the annual, on the date fixed by our Constitution and By-Laws.

The SECRETARY then read a communication from the Secretary of the State Association, stating that Dr. T. H. Manley, who had recently sent in his resignation, had withdrawn it before action had been taken, and therefore it would appear that he should thereby be reinstated. The opinion of this Committee was now asked; and although no definite vote was taken, it was the sense of the Committee that should he present himself at our meetings he should be welcomed and reinstated. The SECRETARY stated that the subject of delegates to the International Medical Congress had been brought up at the last meeting, and delegates had been appointed. It was afterward found that there were to be no delegates from this country, but only foreign delegates. The SECRETARY therefore sent notices to those appointed, to that effect. The meeting then adjourned at 12:30 P. M.

E. H. SQUIBB, *Secretary.*

A meeting of the Executive Committee was held at 177 Montague street, Brooklyn, on Tuesday, May 22, 1888.

Meeting was called to order by the President, Dr. BARNES, at 10:25 A. M.

Present: Drs. EDWIN BARNES, W. B. EAGER, F. U. JOHNSTON, WM. MCCOLLOM, P. B. PORTER, E. H. SQUIBB.

The SECRETARY read the minutes of the last two meetings, which were adopted. A letter from Dr. T. W. Bennett was read, explaining his enforced absence from the meeting. The SECRETARY reported that on Saturday, February 11, 1888, he had sent off voting-slips to the members of the Executive Committee to vote on the appointment of the following Committee of Arrangements for the fourth annual meeting:

Drs. J. D. Rushmore, *Chairman*, J. C. Bierwirth, T. M. Lloyd, W. G. Russell, Avery Segur.

Result of vote: 14 yeas – unanimous.

The report of the Committee of Arrangements was then read and approved.

REPORT OF THE COMMITTEE OF ARRANGEMENTS FOR THE ANNUAL MEETING. 1888.

The undersigned, as your Committee of Arrangements, respectfully submit the following report:

After examining the several rooms that were available for our meeting, it was decided that by far the most convenient for our purposes were these Magnolia Lodge Rooms, 177 Montague street.

We therefore decided to accept the use of these rooms for the sum of ten dollars ($10), with a fmall fee to the janitor. No satisfactory arrangement could be made about serving a lunch in the building; but it is found that there are two or three good restaurants in the immediate neighborhood.

As two sessions are required for the annual meeting, the hour of 11 A. M. is decided upon for opening the meeting, as heretofore.

Respectfully submitted:

(Signed) J. D. RUSHMORE, *Chairman*.
T. M. LLOYD.
J. C. BIERWIRTH.
AVERY SEGUR.
W. G. RUSSELL.
Ex officio { EDWIN BARNES.
E. H. SQUIBB.

The PRESIDENT next appointed Drs. F. U. JOHNSTON and MILTON C. CONNER to act with the SECRETARY as Registration Committee, and this committee were given the list of Fellows in arrears of assessment, for collection at the annual meeting.

The Treasurer then made his annual report, as follows:

The Treasurer begs leave to report that there are now 19 Fellows who have neglected, after several appeals, to pay their assessment of $1, made in December, 1886:

Total receipts from January 16, 1885, to January 2, 1888,		$259.69
" expenses " " " " " " " "		175.50
" amount in Treasury Fund on January 2, 1888,		$84.19
Distributed as follows:		
In Seaman's Savings Bank,	$84.04	
Cash on hand,	.15	
Receipts from May 23, 1887, to January 2, 1888,	$43.69	
" January 2, 1888, to May 21, 1888,	1.00	
Total,	$44.69	

Disposal of funds from January 2, 1888, to May 21, 1888. Bills now due and unpaid:

Advanced February 11, 1888, for 100 2-cent stamps,	$2.00
" May 7, 1888, for 200 1-cent stamps,	2.00
" " 8, 1888, for printing meeting notices,	1.75
Rent of Magnolia Lodge Rooms for annual meeting,	10.00
Janitor of " " " "	2.00
Total,	$17.75
Expenses for the year ending May 21, 1888—bills paid,	$34.10
" " " " " " unpaid,	17.75
Total expenses for the year ending May 21, 1888,	$51.85
" receipts " " " "	$44.69

E. H. Squibb, *Treasurer.*

The Treasurer presented his books with vouchers, to be audited; but upon motion, they were declared audited and his report approved.

The time and place for the next special meeting was next brought up, and after some little discussion, it was resolved to meet some time this summer and on Long Island. The provisional time was fixed for Tuesday, July 31, and the place Huntington, in Suffolk Co.; but the whole subject was left to a committee appointed, consisting of Dr. W. D. Woodend and the Secretary, with power. The Committee of Arrangements recommended was,—Drs. Woodend, *Chairman*, G. B. Banks, M. L. Chambers, E. H. Hamill, Walter Lindsay.

There was no unfinished business. Under the head of new business, the subject of the funds of the Branch was again referred to. The question of a Branch Permanent Fund was introduced. The Treasurer stated that the present funds would last a little over the ensuing year, and by our By-Laws we are not permitted to make a greater assessment than $1 for any one current year; therefore, if any extra funds were to be raised, it must be by voluntary contributions. If about $1,000 could be raised, an opportunity was offered to invest it in such a way that the yearly income would be amply sufficient to carry on the Branch perma-

nently, and thereby do away with the necessity of assessments entirely. There were now 210 Fellows on the roll of the Branch, and it would seem that it should not be difficult to obtain the required amount, some contributing more than others, according to their ability.

After some discussion it was the sense of the Committee that a printed circular be sent to each Fellow of the Branch inviting a voluntary contribution to a Permanent Fund, and that this subject be brought up in the Branch meeting for expressions of opinion and for definite action. There being no farther business, the Committee adjourned at 10:55 A. M.

E. H. SQUIBB, *Secretary.*

A meeting of the newly-elected Executive Committee was held on Tuesday, May 22, 1888, immediately after the Annual Branch Meeting. Called to order by the President, Dr. BARNES.

Present: Drs. EDWIN BARNES, W. B. EAGER, WM. McCOLLOM, J. G. TRUAX, H. VAN HOEVENBERG, E. H. SQUIBB.

In regard to the election of a Secretary for the ensuing year, on motion of Dr. BARNES, E. H. SQUIBB was reëlected.

The question of the publication of Dr. J. L. Smith's paper was then brought up. He requested that it should appear in the "Philadelphia Medical News," as he had already allowed them to publish a part, and had promised them the remainder. As an exception to the rule he was allowed to so publish it. Adjourned.

E. H. SQUIBB, *Secretary.*

A meeting of the Executive Committee was called to meet on the 10:50 A. M. train for Babylon, L. I., on Tuesday, July 31st, 1888; but as a quorum was not found, the meeting was held in the meeting-hall at Babylon, Dr. EDWIN BARNES in the chair. Called to order at 1:40 P. M.

Present: Drs. EDWIN BARNES, WM. GOVAN, WM. McCOLLOM, J. G. TRUAX, W. D. WOODEND, E. H. SQUIBB.

The Secretary read the minutes of the last two meetings, which were adopted. The report of the Committee of Arrangements for this meeting was called for, but none was presented. The sub-committee on the choice of place and time for this sixth special meeting, decided to hold the meeting at Babylon and on this date, and accordingly sent out the announcements to that effect on June 7th. Dr. A. W. HULSE was added to the Committee of Arrangements suggested by the Executive Committee.

On June 21st the Secretary received a note from Dr. E. H. HAMILL, stating that he had removed to Newark, N. J., and therefore could not serve on the Committee of Arrangements.

The President then appointed Drs. LEIGHTON and McCOLLOM to act with the Secretary as Registration Committee.

The time and place for the next meeting were discussed, and it was decided that the next meeting should be the annual meeting in Brooklyn, on the fourth Tuesday in May, 1889. Upon recommendation, the following were chosen as the Committee of Arrangements:

Drs. J. D. RUSHMORE, *Chairman*, J. C. BIERWIRTH, T. M. LLOYD, W. G. RUSSELL, AVERY SEGUR.

Under the head of unfinished business, the Secretary read the following circular, which had been sent out June 7th:

FIFTH DISTRICT BRANCH OF THE NEW YORK STATE MEDICAL ASSOCIATION.

HEAD-QUARTERS: P. O. Box 94, Brooklyn.

The next meeting of the Fifth District Branch will be the Sixth Special Meeting, to be held in Babylon (Suffolk County), on TUESDAY, JULY 31, 1888.

Committee of Arrangements—W. D. WOODEND, M. D., *Chairman*, G. B. BANKS, M. D., M. L. CHAMBERS, M. D., E. H. HAMILL, M. D., W. A. HULSE, M. D., WALTER LINDSAY, M. D.

At the annual meeting of the Branch, held in Brooklyn on Tuesday, May 22, 1888, it was resolved to carry out the recommendation of the Executive Committee to make an appeal to each Fellow of the Fifth District for a *voluntary* contribution to a proposed Branch PERMANENT FUND, which, if established, will entirely dispense with the assessments required from time to time.

There is now an opportunity offered to so invest one thousand dollars ($1,000) that the yearly income therefrom will be amply sufficient to defray the current expenses of the Branch *permanently*. It is therefore the purpose hereby to appeal to each Fellow to subscribe, in the blank form given below, such a sum as he feels willing to contribute, with the proviso that he will not be called upon for the same unless the total amount necessary to fulfil the above object shall have been guaranteed.

By order of the Executive Committee,

E. H. SQUIBB, M. D.,
Secretary.

Please return the following blank form, duly filled out, in the enclosed envelope, at your earliest convenience.

Date...*1888*.

I hereby contribute the sum of .... dollars to the proposed PERMANENT FUND of the *Fifth District Branch of the N. Y. S. Medical Association*, with the understanding that this stipulated sum will not be called for unless the total amount necessary to put the Funds of the Branch on a permanent basis be guaranteed.

$.....................

Yours truly,

Signature..

He then stated that several Fellows had somewhat misunderstood the full scope of the plan, and therefore had objected to it; but when farther

written to and talked with, had acknowledged its justice and benefits,—all going to show that probably still farther explanation and expansion were expedient, either by correspondence or by an additional circular.

To stimulate answers to this scheme from all the Fellows of the Branch, the following type-written slip was sent with the programme of this meeting, on July 26th, to all those Fellows who had not expressed themselves on the subject:

It is the particular desire of the Executive Committee of this Branch to get a free and complete expression from ALL of the Fellows upon the question of the proposed PERMANENT FUND.

To that end, you are respectfully asked to reply in some manner to the circular on the subject sent you on June 7th, 1888.

Any questions, in the way of explanation or otherwise, that you may like to ask, will be gladly answered by the undersigned.

E. H. SQUIBB, *Secretary.*

After some discussion by Drs. MCCOLLOM and TRUAX, and the PRESIDENT and SECRETARY, and after a full expression of the scope and advantages of the scheme had been had, it was recommended to continue the present plan of appealing to the Fellows, with an additional explanatory circular if thought expedient by the SECRETARY, up to the time of the next annual meeting, when a farther report should be made.

The SECRETARY regretted to have to announce the death of Dr. W. G. Stevenson, of Nyack, Rockland Co., which occurred on February 3d, 1888. This only recently came to his notice by note from Mrs. Stevenson.

A communication was next read from the Committee of Arrangements of the State Association for the next annual meeting, requesting the Secretaries of the District Branches "to furnish abstracts of the papers brought before their meetings, the same to be embodied in their annual reports to the State Medical Association."

The SECRETARY remarked that this was a pretty exacting request, and doubted whether it was practicable. The Secretary's duties were such that during a meeting his thoughts were necessarily away from the paper being read,—often for a considerable part of the time,—and when his thoughts did recur to the reading the sequence had been lost and note-taking would be of little practical use. He had tried this plan of abstracting the papers read, early in the history of our Branch meetings, and had furnished copies to the Editor of the Transactions, but they had been thrown out for lack of room in the volume. It is hardly fair, then, to ask for such work if it is to be excluded.

The SECRETARY would, however, attempt it once more, and watch for the result. There being no farther business, the Committee adjourned at 2:25 P. M.

E. H. SQUIBB, *Secretary.*

NEW YORK COUNTY MEDICAL ASSOCIATION.

ANNUAL REPORT.

In conformity with the established custom, the undersigned respectfully submits the following *resumé* as the report of the transactions of this Association for the current year:

The stated meetings have been regularly held; the work accomplished and the interest manifested were fully up to the standard of previous years; and the Association has shown its character to be one of vitality and progression.

The papers presented have, without exception, been of a high order, evincing in their authors earnestness of purpose, industrious research, and power of logical induction; and the discussions following were always extended and interesting, showing breadth as well as accuracy in views, and, withal, characterized by that comity of feeling which brings uppermost the better sentiments of humanity.

October 17, 1887, Dr. J. Lewis Smith read a paper entitled "A Review of some of the more Important Papers presented to the Section of Children's Diseases of the Ninth International Medical Congress." It would be difficult to make an abstract of this most excellent paper. From its extensive scope it was necessarily quite lengthy; and from the interesting nature of the topics it brought to notice, as well as from the well known ability of its author, it was listened to with marked attention, giving opportunity to the members to enter into a prolonged discussion, which was participated in by Drs. Earle, Wood, Gouley, MacGregor, and others.

Dr. Alfred L. Carroll read a paper on "Mineral Water Miracles." This was partly a satirical and partly a humorous comment on the credulity of the people, and the inconsistencies of opinions and testimonials as to the medical value of these articles, showing, by an analysis of their component ingredients, many of them to be absolutely inert.

Dr. J. W. S. Gouley presented a specimen of dermic cyst of the scrotum, in which fatty degeneration had been followed by calcareous infiltration, with the development of a small amount of osseous tissue, true bone-cells being found under the microscope.

November 21, 1887, Dr. Daniel Brown read a paper entitled "History of a Case of Vesical Calculi." The subject of the history was born in Bethlehem (India), of a noble family, in June, 1824. At the age of sixteen, his father, who was governor-general of the province of India, set

him up with a harem of four wives, and made him tax-commissioner of the province. He continued in this position for many years, spending his surplus time in study and travel. When he entered his fortieth year he was thrown in with the American missionaries and embraced their faith, which occasioned his father to subject him to punishments of a severe and cruel nature. From these he managed to escape, and took refuge at the British consulate, after a short time making his way to England, and subsequently coming to this country. He had always been in excellent health, and, with the exception of trivial ailments, was exceptionally robust to within the last few months of his life. In August, 1885, he called at Dr. Brown's office, complaining of inability to urinate. On examination, an exceptionally small penis was found. The meatus would scarcely admit a No. 5 sound. The meatus was incised, and a number of calculi were removed from the urethra, after which the urine was drawn off. The next day he called again, and, by aid of dressing forceps, three more fragments were removed. A sound was then introduced, and the canal dilated daily until a No. 18 sound could be readily passed, when he was discharged, apparently cured. July 8, 1887, he called again, having been unable to urinate for nearly twenty hours. On examination, the same condition of two years before was found, excepting that the canal was larger. The fragments of stone were removed and the bladder washed out, and an alkaline diuretic prescribed. For ten days the mechanical removal of fragments of calculi was repeated daily; and at this time he required to be visited at his residence. Cystitis developed, and he began to lose strength. The weather became excessively hot. The calculi removed varied from the size of a pea to that of a hazelnut The urine was mixed with blood and gelatinous mucus. He gradually failed, and died on the morning of the 19th. The questions which presented themselves in considering this history, the doctor stated, were, Was there a large stone spontaneously ruptured? Were they small stones formed in the kidneys or bladder? Why did not the attending physician discover the true nature of the case? If a correct diagnosis had been made and the large amount of fragments been discovered in the bladder, could life have been prolonged, or possibly saved, by an operation?

Considering the first two questions together, the size and shape strongly indicated that it was a large stone, or possibly two, broken into fragments with sharp angles and edges, irregular in shape. If they were originally small calculi, formed in the kidneys or bladder, it is reasonable to suppose that they would have become more or less rounded from attrition. He cited a number of authorities giving views of the nature of these conditions, and the explanations they advanced relative to the spontaneous rupture of both large and small calculi. He also referred to reports of cases where very large numbers of calculi were found in the bladder.

In considering the question of error of diagnosis, he thought at first,

from the size and shape, that a small stone, possibly of the size of a pigeon's egg, had been broken up; and, as they were coming away daily, and the canal having been enlarged to many times its former diameter, and no fragments too large to pass having been found, it was imagined that the organ was ridding itself of the pieces; and, as there was an entire cessation of symptoms for nearly two years, it was supposed that the cure was complete. When the patient returned, it would have been impossible to successfully operate, owing to his age, extreme heat (temperature 93° to 98°), the rapid onset of cystitis, and his failing strength.

Dr. GOULEY being present, was invited to open the bladder, and, on doing so, commented substantially as follows: "The walls of the bladder are but slightly thickened; at this point [indicating the location] is a sac large enough to have held one of the calculi; as I empty the bladder, we find much larger fragments than those removed. We find here [location indicated] *a number of distinct nuclei, making it evident that there were a number of calculi spontaneously ruptured.* Indeed, the unique feature of the case is the fact that there is not a whole stone left in the bladder." Dr. Gouley then proceeded to discuss the different theories of the rupture of stone in the bladder, and referred to his own explanation, which he had published some years ago.

Dr. J. R. MACGREGOR presented a stone of enormous size; weight, fifty-one ounces; removed (*post mortem*) from the pelvis of a misplaced kidney of a female sixty-three years of age. Associated with this large stone, there were over five hundred and twenty smaller ones, varying in size from that of an almond to a large duck shot; these were also shown. He quoted from various records accounts of calculi of extraordinary size. Discussion followed by Drs. GOULEY and CARROLL.

Dr. IRA B. READ presented the specimen and related the history of a case of pericarditis, with complications. Discussed by Drs. GRAUER and GOULEY.

Dr. FRANK GRAUER presented a considerable portion of the intestines of a patient who had died from perforation of the caecum, which was due to obstruction of the bowel produced by a fibrinous band resulting from chronic adhesive peritonitis. Discussion by Dr. ISAAC E. TAYLOR.

December 19, 1887, Dr J. LEWIS SMITH read a paper on the "Present Opinions regarding the Pathology and Treatment of Diphtheria." This paper treated in an exhaustive manner the aetiology and nature of the disease, and gave a comprehensive summary of the various forms of treatment at present in vogue, including statistical comparisons of the number of deaths and recoveries, where extended inquiries had been instituted to ascertain the relative efficiency of particular remedies. He also gave his views as to dosage and the most approved method of applying the different remedies.

Dr. FREDERIC S. DENNIS read a paper entitled "Selected Cases of Sar-

coma of Bone affecting the Lower Extremities." The author commenced by a statement of the more deadly nature of the disease in comparison with any other variety of malignant tumor, on account of its unprecedented growth, wide-spread metastases, insidious development from unknown causes, uncertainty of early diagnosis, and absolute certainty to kill. Entertaining this conviction concerning the disease, not from hearsay or book-knowledge, but from actual clinical experience, he felt that he could not overstate its gravity and importance. Its various features could be understood only by an exhaustive study of a number of individual cases. The consideration of one typical case affords no reliable knowledge which could be applied to another case. This variety of malignant tumor having a wide range of difference, it is only by comparison that we arrive at any satisfactory knowledge. Before taking up the study of individual cases, he discoursed upon the general subject in relation to its definition, origin, situation, aetiology, and classification. Following Virchow, he defined sarcoma to be a "tumor," consisting of "a circumscribed new formation of tissue." All tumors are divided into three groups: (1) *Histoid tumors*, composed of one of the many forms of connective tissue, and derived from the foetal mesoblast. (2) *Organoid tumors*, composed of several of the normal tissues of the body, these tissues standing in the same relation to each other as in the organ. They are derived from the mesoblast in combination with some elements from the epiblast or hypoblast. (3) *Cellular tumors*, which are composed of tissues differing from the normal tissues of the human body in the extreme abundance of the cells. They are derived from any of the three blastodermic membranes of the foetus. There are only three tumors belonging to this group, viz., carcinoma, sarcoma, and granuloma. It is thus evident that *sarcoma* is a tumor which is composed of tissue cells which normally belong to the human body, and that only extreme proliferation of normal connective-tissue cells is necessary to produce it. The general impression, that in malignant tumors there are new structural elements, is incorrect, for cancer as well as for sarcoma and granuloma, these tumors being simply the result of excess of growth of normal tissue, or else the presence of normal embryonal tissue in places where it does not physiologically belong. In the three germinal layers—epiblast, mesoblast, and hypoblast—there is found a key to a solution of the origin of these malignant and benignant growths. A careful study of the situation of tumors demonstrates the fact that they are found, as a rule, in parts of the body where in the foetus the cell-growth is complicated. Tumors also develop where there is constant irritation or mechanical activity. They also develop in special organs, which are the seat of physiological activity. From these conditions a fair inference can be drawn as to the aetiology of malignant growths. Might not the mere transposition of the cells in embryo from places where they normally belong to places where they are foreign, asso-

ciated with the fact that just the places where tumors grow are precisely those places where there is a union of the different germinal layers in the embryo, explain the aetiology of tumors? Traumatism in developing tumors can be reconciled with Cohnheim's theory of modern pathology, because it is this agency, probably more than any other, that produces proliferation in cell-growth. Traumatism alone might not be sufficient, but in places where a transposition of embryonic cells had already occurred, it might act as a predisposing cause. As regards a special bacillus of sarcoma, little can be said at the present time. This hypothesis is still *sub judice*, and we require more reliable knowledge based upon experimental work to settle the question. In the light of our present knowledge of the aetiology of suppuration, it is not at all unlikely that in the near future this theory may be proved. It is to sarcoma, in particular, that traumatism seems to act as an exciting case. He adopted the classification of Virchow, with a slight modification, in arranging the varieties of sarcoma. In discussing this disease as limited to the long bones, he made a very simple classification formed upon a pathological basis, viz., (1) *Subperiosteal Sarcoma*; (2) *Central Sarcoma*. The clinical history of the disease was then given in detail,—the more important features in diagnosis, prognosis, and treatment receiving particular attention. In regard to the treatment of sarcoma of the long bones, he strongly advocated the early removal of the entire bone affected, with a possible exception in case of a central sarcoma of the condyle of the femur, if recognised early and small in size, in view of the great mortality of hip-joint amputation. He then followed with a detailed history of eight cases, in six of which he operated. Some of the cases were well marked illustrations of the power of traumatism as an exciting cause, the development of the disease following rapidly after the injury. In concluding, he formulated the following propositions:

1. The importance of early recognising the disease, and the necessity of complete removal of the limb by amputation without delay.

2. The importance of carefully watching the subsequent history of a patient upon whom an operation has been performed for the removal of sarcoma.

3. The publication of all cases, whether the result of the amputation was favorable or otherwise, in order to enable surgeons to collect reliable and trustworthy data for future study.

4. The importance of a microscopical examination of every sarcoma. Surgeons are of one opinion upon this point, that a microscopical examination is a *sine qua non* to insure the tabulation of a case for the purposes of study.

5. The importance of a radical operation in these cases of malignant sarcomata affecting the long bones of the extremities, and the condemnation of partial enucleations and the use of caustics and plasters.

6. The importance of encouragement to patients suffering from malignant disease of the long bones, on the ground that early and radical operations, even in the most malignant cases, may result in perfect cure.

The discussion of this paper was participated in by Drs. H. M. BIGGS and J. W. S. GOULEY.

The announcement was made of the death of Dr. THEODORE R. VARICK, of Jersey City, a non-resident member; and the following resolutions were unanimously adopted, and ordered to be entered upon the journal:

Whereas, Dr. THEODORE ROMEYN VARICK, in obedience to the inexorable destiny of our race, has paid the common debt of nature in the prime of his usefulness; and

Whereas, We, as Fellows of the New York County Medical Association, to whom he was endeared by many acts of friendship, desire, in appreciation of his admirable qualities, to pay a tribute to his memory;—therefore be it

Resolved, That we have ever recognised in him a man of sterling integrity, generous impulses, and charitable deeds,—one who, by his achievements in surgery has advanced the knowledge of his art, and added not a little to the glory of our common profession.

Resolved, That we especially cherish his name for his self-reliance and independence, his ethical consistency and his loyalty to science, his edifying remarks in debate, and his substantial contributions to medical literature.

Resolved, That we offer to his family our sincere sympathy in their sudden bereavement, and trust that their sorrow, like our own, may be mellowed by the memory of a life well rounded by works, begun in conscientious endeavor, and ended not without benefit to humanity.

January 16, 1888, a discussion on the "Diagnosis and Treatment of Pleural Effusions" was opened by Dr. E. G. JANEWAY, and participated in by Drs. J. LEWIS SMITH and C. A. LEALE.

It being the annual meeting, the remainder of the session was occupied in reading the reports of the Executive Committee, Corresponding Secretary, Treasurer, and in the election of officers. The number of active members at this date was 256. The Treasurer reported a balance in the treasury of $379.99, being an excess over the balance of last year of $99.99.

The election resulted in the choice of the following officers:

President—J. R. MACGREGOR, M. D.

Vice-President—C. S. WOOD, M. D.

Recording Secretary—FRANK GRAUER, M. D.

Corresponding and Statistical Secretary—J. W. SMALL, M. D.

Treasurer—C. ELLERY DENISON, M. D.

Member of the Executive Committee—C. A. LEALE, M. D.

February 20, 1888, Dr. JOHN SHRADY delivered his address as retiring president of the Association, the essay being characterized by that fertility of thought and felicity of expression natural to its gifted author.

In reviewing the past, he dwelt upon the pleasant as well as the profitable experiences which marked the progress of the year in adding to the mental stock and directing the thoughts into newer channels, and added that the Pierian spring had not gushed in vain, but had been the means of slaking the thirst of the traveller after knowledge. His reference to the meeting of the Ninth International Medical Congress showed a careful estimate of its value and importance as an event in medical history and the lessons it inculcated; its power as an aggregation of individuals in bringing together a vast amount of valuable material, and giving to it shape and method; the fact that there can be but few leaders capable of directing intelligent thinkers by the thousand; and that no one man or body of men can lay claim to indispensability; that the Congress did most excellent work was a conceded fact; that those who represented the state of New York deserve the thanks of their brethren for their patriotism and loyalty; that its ignoring the existence of any such a phantasm as a possible medical centre cannot but redound to the advantage of science. He invoked from those who were successful in bringing themselves into prominence the exercise of a spirit of magnanimity towards those who were less fortunate. In commenting upon the workings of the New York County Association, he pictured its history as one marked by the manifestation of those higher sentiments of dignity, moderation, and kindly feeling; the setting aside of petty personal ambition by seeking for leadership; courtesy in debate; a spirit of tolerance toward those who differed in opinion; and an entire freedom from medical politics. Papers had been read, and none could say with truth that they had not been profitable to our knowledge. One of the objects of the founders of the Association had been to bring out latent talent, with the belief that there was merit in modesty and much that was valuable in the independent thought of the general practitioner. The founders were also skeptical as regards the omniscience of the few, and thought that the dogmatist should be put to the crucial test of proving his assertions, thus putting forth their belief in the maxim that the wisdom of the many was greater than the wisdom of the few. The founders, believing that the profession is capable of the most advanced self-government, had set their faces against the possibility of this or any other body in allegiance degenerating into a Society for the Prevention of Cruelty to Doctors. Hence the acrimony of debate had gone out with the bickerings of the politician and the vaporings of the pseudo-reformer. Much time had therefore been left for real, honest work, and the consequent mental improvement. He stated that, as an Association, we claimed to represent that very large class who pursue their vocation not always with the much desired humility, but rather in spite of the ready sneer and the patronising sufferance. This class was endowed with much independence of thought and action, and exercised the prerogative of qualifying the

statements of enthusiasts and passing upon the merits of alleged discoveries. They occupied the judicious plane—that of impartiality, which should be the highest of all. Moreover, from their point of vantage, with a larger scope of vision, they are therefore more competent to deal with general principles. They, with their stealthy charities and unrecompensed work, may not be awarded cheap statues in the public highways, but there is about them the grime of battle, and the air of veterans who have earned the right of rebuke, and they justly hold that when a new law is discovered it is capable of immediate application. He paid fitting tributes to the memory of Drs. Alonzo Clark, Theodore R. Varick, Gavon Campbell, and T. J. I. Ford, and closed his discourse by a complimentary allusion to an historical incident relating to the ancestry of his successor in office.

Dr. James R. MacGregor, the president-elect, then delivered his address. It was somewhat general in its nature, and embraced a variety of topics connected with medicine. He commenced by stating the difficulties experienced in selecting a subject which comprised anything new; that wherever over the fields of medicine the search after information might be made, there would be found travellers who had been there before and had preëmpted the right to originality. Dissertations of that kind had taken up the history of medicine even as far back as its earliest and traditional times. Depositories of literature had been ransacked for information concerning noted personages in the profession, to learn of their lives and writings. The ethics of medicine and its relations to social development had stimulated individuals to enter into elaborate studies for this purpose. Poetry, wit, and humor had been brought into requisition to cast their illustrations and sparklings over the more dull prose. The exposition of every principle that could give higher conceptions of the dignity and character of our profession, or lead to a more accurate appreciation of duty, appeals to a sense of moral grandeur invoking the benign sentiments of our nature: these had all been utilised. The magazine was exhausted. He then drew a rapid sketch of the organisation of society and the conditions upon which it was founded, and that these conditions resolved themselves into a system of laws, which, although for the most part silent in their operation, were none the less real and all-pervading. In the state of highly organised society, with its complex relations, the status of the medical profession was in some respects peculiar and not easy to formulate. With all there was a natural instinct to preserve health, but in the appreciation of how this was to be done, and what were the best means to employ, the community presented all manner of differences. The grade of intelligence manifested in seeking this object was not always on a par with that exercised toward other objects in life. He alluded to the various superstitions and popular notions of cure, handed down from antiquity, which still held

their sway in various garbs and devices, and that education, combined with a natural intelligence on ordinary matters, was no absolute bar for an individual in his protection against promise, plausibility, and pretence, when considering his medical requirements. Although the relations of the medical man to the community were very close, and affected those matters which led all others in importance, yet they were in a single line of duty and did not bring him within the gaze of the world; consequently physicians were, to a certain extent, a segregated class, and virtually constituted a caste. Most of the other higher pursuits in life brought their members into the range of public notice, and the subjects they agitated mingled with topics of popular interest. As illustrations, he noticed the professions of law, divinity, and journalism. There was no doubt a desire on the part of the community to know something of medicine, but this knowledge so often presented itself in so crude and peculiar a shape as to make it sometimes difficult for the physician to deal with it when exercising his vocation; nor was he always able to have his opinions and advice accepted as satisfactory if they did not comport with the notions of his patient. That the avenues of knowledge were open to all was unquestioned, but a successful search after the choicest fruits was only accomplished upon certain conditions. It called for fixedness of purpose and intensity of interest little short of devotion, and an amount of industry and a degree of self-denial such as few can practise. Society has in all ages recognised practically the truth of this principle, by the established custom prevailing with every class in any special pursuit, to impart a full knowledge to those only who became its members. It was thus that the ancient Chaldeans became renowned as astronomers. It was likewise so with the doctrines of esoteric Buddhism. The history of medicine, philosophy, theology, science, and the arts show the same thing; and the principle is likewise exemplified in the operations of the ordinary mechanic and tradesman. Burns was unquestionably sound in his ethics when he wrote in his epistle of advice to a young friend,—

> "Ay free affhan' your story tell
>   When wi a bosom cronie;
> But still keep something to yoursel'
>   Ye scarcely tell to onie."

He alluded to the arduous and responsible duties of a medical man in active practice, which called for some diversion to obviate their wearing effects,—some resource whereby the mind can be relieved from the weight which is so constantly imposed upon it. This could often be found in other sources of relief than in light and frivolous entertainment. Often the pursuit of some study of a scientific or other nature would afford the necessary relief. He spoke of the undue exercise of the emotional faculties as more damaging to the nervous organisation than the prolonged

exercise of those purely intellectual, and instanced the longevity and retention of the mental powers in philosophers and scientists in contradistinction from poets and musical composers. The duties of the physician called upon the exercise of the emotional faculties to as great an extent as in any other pursuit. The closing part of his discourse was occupied in stating the claims of medical societies upon their members, and the duties the latter owed to the former, and that in the fulfilment of these duties the society was not only benefited, but it would likewise in this fulfilment redound to the benefit of the contributor as an act of discipline to himself. He invoked a hearty and earnest sentiment of interest in advancing the science and art of medicine to a higher plane, and predicted for it a bright and noble future.

March 19, 1888, Dr. Ira B. Read read a paper on "Acute Articular Rheumatism." He drew a graphic picture of a typical case with its surroundings, which would present itself to the attention of the physician on his first visit, and in the history which would be given the patient or his friends would generally have the diagnosis made beforehand, and the physician upon examination would find the diagnosis to be correct. Upon his departure he would ask himself the cause of this sudden change from apparent health to disease and suffering? What conditions of the system furnish the soil on which this seed may thrive? From whence comes this seed? What will soonest kill it and its rheumatic growth, and leave the body a fit resting-place for the seeds of health only? To these questions the answers had been unsatisfactory; and they were asked again, not to be answered by himself, but because in a multitude of counsellors some wisdom and truth might be brought to light for the benefit of knowledge and the relief of suffering humanity. In recounting the generally acknowledged causes, he referred to the existing conditions of those attacked, amongst which was the fact that the disease was far more prevalent between the ages of fifteen and thirty. He did not accept the explanation of this on the theory that during this period of life the resisting power of the system was lessened against the attacks of this particular disease. If this were true, why was it that in the descending hill of life, when the powers of resistance were sensibly less, there was less liability to the disease? He also discussed other supposed factors in the causation, such as heredity, strength, sex, &c., stating that these simply represented different degrees of resistive power when attacked. It was the exciting cause which was all-important to determine. Why did similar exposures to cold or wet cause acute articular rheumatism in one, bronchitis in another, pneumonia in a third, and renal disturbance in a fourth? Why was it that in the patient it was only the joints, and, indeed, only some of these, that were red, inflamed, swollen, and tender? Why, in a few hours, did we find that the pain and swelling had left one

joint and attacked another heretofore painless, and, again leaving that, returned to its former location? In pursuing this subject, he inquired if there was a "bacteria-rheumatica" or "rheumacoccus," whose taste was so Epicurean that it would feed only on joints, and refuse to be cultivated in aught but synovial fluid, and not even in this unless properly cooled and moistened by exposure to cold and wet. Over these questions a cloud rested, and must remain until cleared away by the light of knowledge. In our pathology we were all at sea, as we could not agree whether local disturbances were the cause or the effect of general manifestations. In the considerations of treatment and prognosis, what was known was far more positive and satisfactory; and he gave a statement of the particular and general management of the disease which had been efficient in his hands.

Discussion was participated in by Drs. ELIOT, TRUAX, CARROLL, WOOD, McLEOD, LEALE, GRAUER, and MACGREGOR.

April 16, 1888. Dr. JOSEPH E. JANVRIN read a paper entitled as follows: "On the Primary Removal, by Abdominal Section, of the Tube and its Contained Foetus, in Cases in which Pregnancy has been Diagnosticated before Rupture of any portion of the Tube has occurred." The essayist began by making the statement that "By 'primary' abdominal section in these cases he meant abdominal section performed for the removal of the tube and its contained foetus *before any* haemorrhage has occurred into the peritonaeal cavity from a rupture, or a *partial* rupture, of the cyst wall, the pregnancy having been diagnosticated prior to the laparotomy, and the operation having been performed with the expectation of delivering the tube and its contained foetus intact. Farthermore, the operation must have been done before the end of the fourth month of gestation."

He referred to another paper, written by himself in September, 1886, and published in the transactions of the American Gynaecological Society for that year, in which he made the statement "that in cases where a moderate haemorrhage has been positively diagnosticated, and this haemorrhage has occurred prior to the termination of the fourth month of gestation, it is undoubtedly better surgery to perform laparotomy at once, and thus remove all possible danger of farther haemorrhage, than to trust to electricity in any form." Cases of this kind, in which a positive diagnosis could be made, had been rare up to the present time, principally, he thought, from the fact that the full significance of the so called "colicky pains," with the shock and collapse, had hardly been appreciated. He was convinced that in these attacks there was always some bleeding, although it might be very slight; and that, as a rule, three or four attacks occurred before the real rupture of the sac took place. He advocated that where the symptoms were becoming at all alarming, we should resort to laparot-

omy. In all cases of considerable haemorrhage, there was, as a rule, a decided tear in the sac; and, in his opinion, as soon as the patient rallied from the shock sufficiently to have a fair prospect of recovery, the operation was demanded. He believed that it was easier to recognise this condition than a case of hydrosalpinx; and he had become convinced that in any case in which, from the rational and physical symptoms, he became satisfied that he had to deal with a tubal pregnancy, *even before* symptoms of a rupture of the peritonaeal covering of the tube occurred, he would operate if he could obtain the consent of the patient. Even if mistaken in diagnosis, he would certainly find something which ought to be treated surgically. Up to the present date, he had been able to find but one case on record in which the operation had been performed prior to a laceration or a partial laceration of the tube, and before the fourth month of gestation. In all other cases, he believed that one or more decided haemorrhages had occurred before the removal of the tube and foetus. These he would class as secondary operations. Mr. Lawson Tait had reported thirty-six operations of this latter kind, done during the past three years, with thirty-five recoveries. Prof. A. Martin, of Berlin, reported nine operations of this kind, with but one death. In this country he had found reports of six cases by various surgeons.

The propriety of enlarging this field, and of removing the tube with its contained foetus *before* any rupture has occurred, and during the early weeks of gestation, instead of resorting to the use of electricity for the purpose of destroying the life of the foetus, he had advocated on every possible occasion during the past year and a half. He was aware that until very recently he stood alone in this opinion. He found that other gynaecologists beside himself had come to the same conclusion, notably Mr. Lawson Tait, who writes,—"If there was any reasonable supposition that there was a tubal pregnancy which had not yet ruptured, I should recommend immediate operation." The objections stated against the uses of electricity in tubal pregnancy were, that it was frequently followed by protracted suffering to the mother, and with conditions of chronic invalidism; attacks of peritonitis several years subsequent to the death of the foetus; and owing to its retention in the abdominal cavity, and, as stated by Mr. Tait, the danger that the placenta will go on developing enormously from natural causes.

The paper was discussed at length by Drs. Lusk, Harrison, Currier, Dudley, and Newman.

May 21, 1888, Dr. D. C. Cocks read a paper entitled "The Ophthalmoscope a Necessity to the General Practitioner."

This paper treated of many of the conditions of general and special diseases, in the diagnosis of which the ophthalmoscope furnished a positive aid, and was often decisive in determining the nature of a case. The opinions he advanced were embodied in the following propositions:

1. More exactness in diagnosis and treatment is required of us than of our predecessors.

2. In order to meet these requirements, we must use the instruments that science offers us.

3. As microscopes, stethoscopes, thermometers, etc., are considered essential in the practice of medicine; and,—

4. As the ophthalmoscope not only shows the morbid changes occurring in the eye,—as neuritis, anterior and posterior synechia, cataract, membranes in the vitreous, retinitis, choroiditis, and keratitis,—but also gives valuable aid in assisting diagnosis in general disease, and in numerous instances gives the one missing link that is needed to make the diagnosis clear; and,—

5. As the time is close at hand when the consultant will ask, What does the ophthalmoscope show? with as positive an expectation of receiving an account of the appearances of the fundus as he now does of the urinary examinations;—therefore,—

6. The ophthalmoscope is a necessity to every progressive practitioner of medicine; and being so,—

7. We can no longer afford to be without one, or to neglect its teachings.

The paper was discussed by Drs. Oppenheimer, Leale, Truax, Wood, Michel, Camplin, Bleything, and MacGregor.

Cases of interest in private practice were then related by Drs. Oppenheimer, Leale, and Wood, each of which received appropriate discussion.

June 18, 1888, Dr. George T. Harrison read a paper on the "Natural Mechanism of the Expulsion of the Placenta and the Proper Management of the Placental Period." The author began by stating the importance of a knowledge of the physiological action in this process, in its bearings upon practical rules which may be of value to the obstetrician. He referred to strong statements from Drs. Matthews Duncan and Playfair in support of this claim. In Germany, within the last few years, a most animated controversy has been in progress upon this theme, as the result of which much valuable material has been accumulated, of great help in explaining the physiology of the placental delivery, and in laying down principles in guiding its management. The Credé method had been the one most generally in favor until 1880, when Dohrn took issue with the practice of active interference it involved, and advocated the adoption of an expectant plan of treatment. Ahfeld took a similar view, and, on the basis of a large clinical experience, combated the Credé procedure, charging upon it a greater loss of blood than in the expectant plan, and its liability to occasion the retention in the uterine cavity of remnants of decidua and chorion, which he regarded as often productive

of the most disastrous consequences to the puerperal woman. It is to Schroeder, Hofmeier, Ruge, and Stratz, who have recently studied the physiolgy of the placental period, that we are indebted for much of our knowledge concerning it. He then gave a description of the mechanism of the process, and contrasted the views of Matthews Duncan and Schultze, stating as his opinion that the mechanism as described by the latter was the usual one, and that that described by Duncan as the normal one was the exception. He then followed by giving a description of the microscopic appearances of the zone of attachment of the placenta to the uterus as stated by Ruge, which are substantially as follows: Cords of attachment to the decidua serotina are formed, consisting of a net-work of connective tissue, the meshes of which are susceptible of extensive displacement without actual separation, the bands of these meshes containing the vessels which effect the exchange of gas between maternal and foetal placenta. This phenomenon explains why, in spite of labor pains and retraction of the uterine body, the foetal circulation is not disturbed, and constitutes a locus minoris resistentiae where the complete detachment takes place farther on, and during labor renders it possible for the placenta to follow the contracting surface of the attachment. The location of this development, which is regarded as a provisional, histological arrangement, is not situated in any definite layer of the decidua, but may be sometimes higher, sometimes lower. In the beginning of labor, relaxation in this structure commences, and becomes more complete as the labor advances. The degree of relaxation with the displacement of the placenta from the uterine wall is greater at the centre than at the edge, where the attachment is closer. There is a laxity in the placental portion of the uterus; it does not follow the remainder of the uterus in the contractions, and always remains thinner, because the placenta is pressed against it in consequence of increased intra-uterine pressure during "the pains." The contraction and retraction of the muscular tissue is here more incomplete, and does not take place so quickly, consequently the place of attachment does not diminish so energetically in all directions as would suffice for the detachment of the placenta. He then proposed the question, Does the change in the size of the uterus, appearing immediately after the birth of the child, suffice for the detachment of the placenta, or are several independent contractions necessary? He referred to the three ways of detachment stated by Barbour, viz.,—

1. The result of the change in size of the placental place after the evacuation of the uterus; or,—

2. The consequence of the haemorrhage or escape of serum behind the placenta; or,—

3. The result of uterine contraction, and of the endeavor on the part of the uterus to expel the foreign body.

Barbour decides in favor of the latter mechanism. Ahfeld concludes

that the reduction in size of the placental place is the most important factor, the central part separating first, and the space being filled with blood by aspiration. Cohn, of Berlin, believes that it is singly and alone the "pains" belonging to the placental period which effect the detachment, and that the first uterine contraction of this period is the most important and facilitates the formation of the retro-placental effusion of the blood, which is the second important factor in the process. Then the subsequent uterine contractions complete the expulsion through the ring of contraction into the lower uterine segment. He then spoke of the various methods of the management of this state,—that of Credé, the Dublin method of energetic friction and kneading; the expectant method advocated by Dohrn; and the method advocated by Schroeder, which was to wait until the diminution and ascent of the body above the symphysis indicates that the placenta is expelled from the uterine cavity, then by gentle pressure to expedite its passage through the vulva. This latter method he had found perfectly satisfactory in practice, and he urgently recommended its adoption. The method of Credé he would reserve for the cases in which the placenta did not become detached, or descended edgewise with the upper edge fixed in the uterine body. He concurred with Credé in regarding as innocuous the retention in the uterine cavity of membranes and decidua, provided the conduct of the labor had been aseptic; and he referred to the statistics of the Leipzig Clinic and Polyclinic, where no regard was paid to the frequent occurrence of retained remnants of ovum and decidua, yet in 4,969 births no single puerperal woman died, or was even very sick.

The paper was discussed at length by Drs. McLeod, Wood, Leale, White, and MacGregor.

Dr. C. A. Leale read a paper on "Septic Paronychia," occurring among the young ladies of New York city, caused by the so called manicures, who, in their ignorant manipulations, had cut away the tissues around the finger-nails, and then with their instruments had inoculated finger after finger, until eight ladies had been poisoned.

Dr. Leale described the disease as a painful and destructive inflammation of the tissues surrounding the finger nails, known as septic paronychia, and which may be due to injury and subsequent inoculation. The cause of the trouble may generally be traced to a cut or torn hang-nail, and the introduction of a poisonous material into the newly opened wound. During the past year he had seen eight cases, in each of which the cause was by direct infection from the finger of one young lady to those of others by a "manicure," who had used her own infected instruments on a number of fashionable victims, although each patient had her own private set of instruments, the excuse being that it was more convenient to use the same instruments for all,—which was done without the necessary cleansing, and by an erroneous method of cutting the sides of

the nails far into the matrix for the purpose of giving the finger-tips a pointed appearance.

In most of the cases where efficient treatment was resorted to, the inflammation did not proceed to the formation of deep abscesses, but healed quickly. The pain and swollen condition of the finger ends prevented the young ladies from taking their usual piano lessons. Three of the patients became impatient, and during the active inflammatory stage attempted to use their sore fingers, and, by forcibly striking the tips on the keys of the piano, injured the deep-seated proximal ends of the soft, newly forming nails, ending in suppurative necrotic perforations of the nails,—or long transverse fissues were seen within the following ten days, when new nails made their appearance.

In several instances fungoid granulations grew around the margins of the nails, leaving the sharp, dead edges of the latter to burrow into the sensitive nerves at the ends of the fingers, causing, until excised, great pain and so many sleepless nights that a resort to anodynes, or local anaesthesia, became necessary.

Dr. Leale stated that when septic paronychia was properly treated during the early stage of the disease, and the surrounding parts kept in a macerated and soft condition to permit the superficial distension of the tissue over the newly forming pus, and the finger ends guarded from farther violence, a rapid cure might be expected, after the exit of the pus, without any resulting deformity; but where, from a depraved condition of the system, or improper treatment, the disease extended around and beneath the nails, the destruction of the matrix might follow to such a degree as to cause a permanent deformity of the nail, or even the end of the finger. He added, that with our present knowledge of aseptic and antiseptic surgery, he believed it his duty to bring such facts and dangers to the notice of the profession.

The paper was discussed by Drs. Gouley, Wood, Harrison, and Benedict.

Dr. J. R. MacGregor presented a microscopical section of Macroglossia, the subject of which was a child four years of age, accompanying the exhibition with some observations on the histological formation and development of the disease.

The existing custom of partaking of a moderate collation at the close of each meeting has been continued. It has furnished opportunity for the interchange of much pleasant, social discourse, and no doubt has been the means of uniting the members in closer bonds of friendship.

James R. MacGregor,
President.

ANNUAL REPORT OF THE COUNCIL

AND

MINUTES OF THE SESSIONS OF THE COUNCIL

FOR THE YEAR 1888.

The Council met in annual session in the library room in Carnegie Laboratory at 8 P. M., October 8, 1888.

Present: The chairman, Dr. CRONYN, and Drs. BROWN, CARROLL, FERGUSON, GOULEY, HINTON, JAMISON, LEALE, and SELDEN.

The SECRETARY reported the following appointments of Fellows by circular vote, viz., Robert Lewis, M. Willoughby, Albert D. Lake, F. J. Sherman, J. S. Bird, George T. Howland, L. A. VanWagner, R. A. Thompson, William H. Jackson, William R. Ballou, J. T. Sweetman, Jr., A. W. Cottrell, P. C. Curtis, Charles S. Benedict.

The following candidates were appointed: George H. McTammany, Albert T. Weston, and Henry D. Ingraham.

After a general discussion of the question of delinquency in the payment of dues, the following was adopted:

Resolved, That the President now appoint a Finance Committee of three members of this Council, whose duties shall be,—(1) to examine from time to time the Treasurer's accounts; (2) to acquaint themselves with the financial state of the Association; (3) to take measures to effect the settlement of the accounts of delinquent Fellows; and (4) to make to the Council, through the Secretary, a quarterly report of their proceedings.

Resolved, That the Treasurer make to the Finance Committee a statement of the funds in the treasury, and of the unpaid dues, and that he transmit to the committee, when so requested, a list of the names of all delinquents, and the amount due to the Association by each delinquent.

Resolved, That the committee be directed by this Council to prepare a circular letter, to be addressed to each delinquent Fellow, with a statement from the Treasurer of his indebtedness. To this letter should be appended Section 4 of Article VI of the By-Laws, the letter to be signed, By order of the Council, by the Secretary of the Association.

Resolved, That a copy of these resolutions be forthwith transmitted to the Treasurer, and to each member of the Finance Committee.

The Chairman appointed Drs. ISAAC E. TAYLOR, A. L. CARROLL, and J. W. S. GOULEY as that committee.

The bill of the Librarian for $12.03 for disbursements was approved, and the Treasurer directed to pay the same.

The Director of the library then reported as follows:

Fourth Annual Report of the Library Committee of the New York State Medical Association.

October 9, 1888.

The Library Committee have the honor to present this their fourth annual report.

During the past year the increase in the number of volumes has been nine hundred and fifty-five (955), including the two hundred and ninety-eight (298) volumes contributed by Dr. Nathan S. King. In addition to the above, sixteen hundred and seventy-six (1,676) volumes have been deposited in the library by Dr. Isaac E. Taylor, making a total increase of twenty-six hundred and thirty-one (2,631) volumes.

The subjoined summary, furnished by Dr. E. S. F. Arnold, acting Librarian, gives the number of volumes now contained in the library.

Volumes of books, including duplicates,	2,970
Volumes of journals, including duplicates,	2,594
	5,564
Dr. Taylor's library,	1,676
Total number of volumes in the library,	7,240

The journals referred to above consist of completed volumes. There are many beside, not included in the 2,594, which are nearly complete, wanting only one or two numbers.

Dr. Taylor's library is particularly rich in original English, French, and German editions of valuable works.

The library hall is now so overcrowded that provision should be made for more ample quarters.

The committee's thanks are again warmly tendered to Dr. Arnold for his most efficient labors in the library.

J. W. S. Gouley,
Director of the Library and Chairman of the Committee.

The chairman of the Committee on Publications then made the following

Report of the Committee on Publications for 1887.

The fourth volume of the Transactions was issued in April last, and has been in the hands of the Fellows long enough to render superfluous any comments on its professional value and typographical excellence.

The cost of its publication, exclusive of distribution, was $1,366.50, a smaller disbursement than for any preceding volume.

As in former years, the preparation of the work was much retarded by delay in forwarding manuscripts, some of which were not received by the editor until more than two months after the session of the Association. On account of the necessity of continuous paging, the withholding of a single article arrests the entire machinery of the press; and the committee would again impress upon authors the importance of having their papers in readiness for the printer at the time of the meeting.

ALFRED L. CARROLL, *Chairman.*

October 8, 1888.

On motion the report was received, and the thanks of the Council were extended to Dr. Carroll for his important service to the Association in editing the last two volumes of the Transactions. It was the wish to express to him a profound appreciation of the great labor which he had expended in the work, and the admirable manner in which all the details had been carried out, resulting in volumes of which we could all be proud, and nevertheless with an important saving to the treasury of the Association.

After a conference relative to the arrangements for the annual meeting, it was resolved that any deficiency in the fund for the entertainment to be furnished on Wednesday evening at one dollar for each ticket shall be paid out of the balance remaining from the fund subscribed for the entertainment at the last annual meeting.

The Secretary was directed to present a set of the Transactions to Mr. Francis Kinsler.

The minutes were read and approved.

Adjourned.

E. D. FERGUSON, *Secretary.*

The Council met (after the close of the annual meeting of the Association) at the Hotel Brunswick in New York city, on October 11, 1888, at 4:30 P. M., the Chairman, Dr. LUSK, presiding.

In addition to the Chairman, there were present,—Drs. CARROLL, CHITTENDEN, FERGUSON, GOULEY, HINTON, JEWETT, MENZIE, STRONG, and TRUAX.

The following applicants for Fellowship were reported as having been appointed by circular vote by the last Council, viz., Charles Hammer, E. Frank Marsh, Edward A. Williamson, George G. Phelps, George E. Hubbard, John M. Julian.

The application of Martha C. Holmes was received, and the candidate appointed a Fellow.

On motion, New York city was designated as the place for the next

annual meeting, the sessions to be opened on the fourth Wednesday in September, 1889.

On motion, the members of the Council for the Fifth District were appointed the Committee on Publications, with Dr. A. L. Carroll as editor of the volume of Transactions.

The members of the Council for the Fifth District were then designated as the Committee of Arrangements for the next annual meeting, with Dr. J. G. Truax as Chairman, and with power to add to their number.

The Chairman announced the appointment of Dr. Isaac E. Taylor as member of the Council at large.

The minutes of the meeting were approved.

E. D. Ferguson, *Secretary.*

MEMOIR OF H. C. HALL, M. D.

BY S. P. ALLEN, M. D., OF BROOME COUNTY.

Dr. H. C. Hall was born in Triangle, on the farm now occupied by his only brother, Eugene Hall, August 31, 1844.

He was the son of Henry and grandson of Reuben Hall, both of whom lived on the same farm before him. He remained at home with his parents and attended the district school until 1860, when he went for two years to the academy at Homer, N. Y.

In the fall of 1864 he enlisted in the War of the Rebellion, where he served his country faithfully until June, 1865, when he was honorably discharged.

During the year following, he attended the seminary at Cooperstown, N. Y., and in 1867 commenced the study of medicine with Dr. S. H. French, of Lisle, N. Y. He took his first course of lectures at Ann Arbor, Mich. His second course was taken at the University of New York. He afterward took a special course in surgery, and then commenced the practice of his chosen profession with Dr. S. H. Harrington, at Chenango Forks, but remained here only a short time, when he bought out Dr. S. H. French, 2d, of Lisle, to which place he then removed, and for sixteen years continued in active practice, and much of the time beyond his strength,—for he was almost constantly suffering from disease which was the result of undue exposure while in the army, and which, without doubt, was a cause of his early dissolution. Notwithstanding this, he never complained of his own suffering, but often responded to the sick calls of others when himself was suffering most.

Dr. Hall was always prominent in all public and benevolent enterprises. As a citizen he was honest, generous, and public-spirited, warm-hearted and genial in all his relations with his fellow-men. Politically he was a staunch Republican, and always gave his influence in support of that party, acting on the county committee for several years, and his opinions were always carefully listened to by his fellow-townsmen, for they were generally found to be correct.

As a physician the doctor had many warmly attached friends, who had the fullest confidence in his skill and ability, yet he never sought or courted popularity. He had a high opinion of the dignity and honor of his profession, and despised the man who would resort to trickery to procure business.

He believed that the dignity of the profession demanded that the physician should receive a reasonable compensation for his services where the parties were able to pay, but he was always ready to render his services gratuitously where the parties were unable to compensate.

As a physician and surgeon he was eminently a practical man; his powers of observation were truly remarkable; he saw at a glance, as it were, all the symptoms of a case, and rapidly formed his conclusions, which seemed to be intuitive rather than the result of negative reasoning. His diagnosis was quickly formed, and almost invariably correct, and he seldom changed his first opinion of a case.

He was not only endowed by nature with those physical qualities which admirably fitted him for the profession of his choice, but mentally with those powers essential to success. His talents were beyond those ordinarily allotted to his fellow-men, as was shown in the soundness of his judgment and the brilliancy of his intellect. With a well balanced mind, active and energetic, he was in full possession of those requirements which are so necessary to the gentleman and physician. As a physician and surgeon he loved his profession, and devoted his best energies to becoming well acquainted with its general principles and doctrines as taught by the best authorities of his time, always directing his attention to the practical application of his acquired knowledge.

He kept himself well informed in the progress of medical science and the various improvements of the day, confiding only in those that had passed the scrutiny of his careful observation and experience.

He was very industrious and methodical in his business, and was thus enabled to do an amount of work that to most men would seem almost incredible. He never allowed any time to run to waste, but was always busy, scarcely ever taking a vacation even for a single day; and this incessant hard work night and day, together with an already enfeebled constitution, had so told upon the vital forces, that when he was finally laid upon a sick-bed nature had seemed to lose all her recuperative power, and he gradually continued to fail in strength for ten long weeks, and he finally passed quietly away June 1, 1887, and was at peace with his Maker.

He was always conservative in all his views, and was never led away by doctrines radical or extravagant. He never married, but took to his home his aged and invalid mother, whom he tenderly cared for and carefully watched over as long as he lived.

He was for years a consistent member of the Congregational church, and always attended upon its services when his professional duties would permit. He became a member of the Broome County Medical Society in October, 1871, and was one of its censors for several years. He was one of the original Fellows of the New York State Medical Association, and always took a lively interest in its growth. He was also a member of

the Masonic fraternity and of the G. A. R., and his burial services were conducted by those orders.

In conclusion, let us say, in the language of another,—"Happy, if, when our account is made up, we shall be found, each in his appropriate sphere, like our honored fellow-member, to have done some service to the community or state. Then, whether we are called in the morning of life, or at its fervid, bustling noonday, or in the declining hour, to depart, our memories will be cherished, and our names implore the passing tribute of a sigh."

MEMOIR OF ALEXANDER AYRES, M. D.

BY S. H. FRENCH, M.D., OF MONTGOMERY COUNTY.

Dr. Alexander Ayres was a descendant of Captain John Ayres, one of the early colonial settlers of Massachusetts, who came to Ipswich in 1648. The grandfather of Dr. Ayres was three years and nine months in the Revolutionary service, and was among those who spent that terrible winter at Bound Brook, N. J.

The father of the subject of our sketch was born in 1774, in the town of New Braintree, county of Worcester, Mass., and moved into the state of New York in 1792.

Dr. Alexander Ayres was born in the town of Oppenheim, Fulton county, N. Y., April 9, 1811. His mother's maiden name was Abigail Bean, who was also of Massachusetts origin.

His early days were passed in Manheim and Brockets Bridge, N. Y., to which place his parents moved shortly after his birth. His early educational advantages were such as were obtainable in the common schools of that day. His father, who was a farmer, required his services in summer, so that he was compelled to make the most of his time in winter, but by close application he was able to fit himself for teaching at the age of nineteen.

He taught for several successive terms in Little Falls, and subsequently near East Creek, N. Y. About the year 1833 he commenced the study of medicine in the office of Dr. Daniel Ayres, of East Creek, N. Y. He attended lectures for two years at the College of Physicians and Surgeons of New York (then located at Fairfield, N. Y.), and was licensed to practise "Physic and Surgery" by the Montgomery County Medical Society in 1836. In June of the same year he graduated from Castleton Medical College in Vermont.

During this year he married Miss Harriet C. Farr, of East Creek, and very soon after moved to Michigan, locating and practising for three years at Pontiac. The loss of his first child, with a long and severe illness of his wife from malarial poisoning, induced him to return to this state, when he settled at East Creek, where he practised medicine until 1857, when he moved to Fort Plain, where he continued in the active practice of his chosen profession up to a short time before his death. He was very strong and active for one so far advanced in years, up to the time of the death of his wife, which occurred January 7, 1886. He felt her loss keenly, and from that time appeared to begin to lose his usual

deep interest in general matters, as well as those pertaining to his profession. He gradually grew weaker, without apparently suffering from any particular disease, and died peacefully August 27, 1886, aged seventy-six years.

Early in his medical life Dr. Ayres became a member of the Montgomery County Medical Society, and kept up his interest and membership to the day of his death. He was elected a permanent member of the New York State Medical Society in 1863. He was one of the Founders of the New York State Medical Association. He always took a lively interest in the meetings of all these societies, and often attended them at a considerable personal sacrifice and inconvenience.

Very few physicians are able to endure the wear and tear of a physician's life for fifty years, as did Dr. Ayres, and very few, if they do so live, are able and willing to so keep abreast of the advances and discoveries in the medical sciences as to command the confidence and respect of their medical associates for half a century. That Dr. Ayres was able to do all this shows that he was endowed with a mind and body of uncommon vigor, and that the few opportunities and spare hours of his life were utilised to the utmost.

Dr. Ayres was a gentleman of the old school. He was courtly and dignified in his manners, and entirely honorable and gentlemanly in his treatment of his medical associates. His extensive knowledge of the medical and allied sciences, his quick apprehension and keen insight, and his honorable dealing, brought him into great repute as a consulting physician, and his services in that capacity were in almost constant demand for many of the last years of his life.

It is a great gain to the world to have such a man come into it, and a great loss to have him leave it.

MEMOIR OF FREDERICK HYDE, M. D.

BY CALEB GREEN, M. D., OF CORTLAND COUNTY.

Dr. Frederick Hyde died at his home in Cortland, N. Y., Oct. 15, 1887. In commenting on this event, a local journal thus gives expression to its estimate of the life and character of the deceased:

This community has met with a loss that will not soon be supplied. Nor is the loss confined alone to this community or our immediate surroundings, for his field of labor extended to many leagues from his quiet home in Cortland. His reputation for skill and learning in his chosen profession had long since passed far beyond the bounds of the state in which he lived, and as it had genuine merit for its foundation, it will not soon be forgotten. The loss which the medical profession at large has sustained in his death will be sorely felt. His long and active life had almost entirely been devoted to his profession, and he often gave his brethren the results of his studies and researches in carefully prepared papers, which were published in some of the medical journals, or, more frequently, read before some of the many societies of which he was a member, and which were afterwards printed in their transactions. As a surgeon, he was especially eminent, and his calls to perform difficult and dangerous operations were frequent, and often at a great distance from home. That he was entitled to all the praise he received in this branch of the profession, his uniform success, where success was possible under any circumstances, abundantly proves. Who will take his place? is a question that has often been asked since his death, but to which, as yet, we have heard no answer.

Dr. Hyde was born at Whitney's Point, Broome county, N. Y., Jan. 27, 1807. His father, Col. Ebby Hyde, was the thirteenth child of Gen. Caleb Hyde, of Berkshire county, Mass., who was for some time sheriff of that county, and had been an officer in the Revolutionary army. Gen. Hyde, about 1790, removed from Lenox, Berkshire county, Mass., to Lisle, Broome county, N. Y. Here he was appointed major-general of the state militia, was elected senator from the western district of New York in 1803, and was chosen in 1804, by the assembly, as one of the council of appointment. Several of the brothers of Gen. Hyde bore an important part in the Revolutionary war. Dr. Hyde descended from one of the early New England families, who settled in Norwich, Conn., about 1660. With the pioneers from New England, the church and the school-house were among the earliest structures provided for, however limited their equipment or support. But that the schools of that early day did good work, when they had good soil in which to sow the seeds of knowledge, is evi-

denced by the fact that the subject of this sketch, when a little less than fifteen years old, took up his journey, one morning, on foot, over the hills eleven miles away to Freetown, Cortland county, where he was established as master of the district school. From this time on, the rule seemed to be to teach during the winter and attend school in the summer, until, as it is recorded, he taught throughout the year. In the winter of 1831, when on one of his pedagogic ventures, he found himself in the family of Dr. Hiram Moe, of Lansing, N. Y., and there commenced the study of medicine, which he afterwards pursued in the office of the accomplished and scholarly Dr. Horace Bronson, of Virgil, Cortland county. The influence of Dr. Bronson on the mind of his pupil was of the happiest kind. The doctor was a keen and accurate observer, and of a practical turn of mind, qualities which with profit showed themselves in his pupil in after life.

As was often the custom at that time, after having attended one course of lectures at the College of Physicians and Surgeons of the Western District, at Fairfield, N. Y., he was licensed by the Cortland County Medical Society in 1833, but continued his studies until the fall of 1835, riding on horseback over the hills of Virgil and the adjoining towns with his preceptor, and making practical study and observation of medicine, surgery, and obstetrics. Then he returned to Fairfield, took another course of lectures, and was graduated in 1836. Soon after his graduation he removed to Cortland, and entered into partnership with Dr. Miles Goodyear, at that time the leading practitioner of the place. Here he soon acquired a respectable practice, which continued to increase until the time of his death. His natural dignity, commanding presence, and suavity of manner readily obtained for him the favorable consideration and confidence of the community. His presence in the sick-chamber was, and has continued to be, a benediction.

He was married, Jan. 24, 1838, to Elvira, the oldest daughter of Dr. Goodyear. They had two children,—Augusta, the elder, who remains at home the companion of her mother, and Dr. Miles Goodyear Hyde. The former, after due preparation, was admitted to Mt. Holyoke Female Seminary, and graduated with the class of 1862; the latter entered Yale in 1861, graduated in 1865, and afterward took the medical course of Geneva Medical College, graduating in January, 1868. He afterward held the Adjunct Professorship of Anatomy in the College of Medicine of Syracuse University for two years.

In 1854, Dr. Frederick Hyde was appointed to the chair of Obstetrics and Medical Jurisprudence in Geneva Medical College, and gave the courses on those subjects during the session of 1854–'55. In 1855 he was transferred to the chair of the Principles and Practice of Surgery. In this position he continued to give the annual courses of lectures until the winter of 1872, when, on the establishment of the College of Medi-

cine of Syracuse University, most of the Geneva faculty were transferred to and incorporated with the Syracuse institution, the old Medical college at Geneva, which had existed since 1835, being disbanded.

In this transfer Dr. Hyde took a prominent part, and had many anxious conferences with Bishop Peck and the local members of the medical faculty, until the status was reached that secured a smoothly working institution. Here Dr. Hyde continued to lecture on the Principles and Practice of Surgery until the opening of the term of 1887–'88, when the weight of advancing years and the insidious but sure progress of disease bore him down, and extinguished the lofty and ambitious spirit which he had so proudly maintained in the labors and struggles of more than fourscore years. He died, as he evidently wished to do, with the harness on. He was one of the oldest medical teachers in the United States, and few had occupied the professor's chair longer than he.

He had, in the course of his long life, occupied many positions of honor and trust, both medical and civil. We can only notice a few of these, but enough to show the confidence reposed in him and his capacity for hard work.

In 1841 he was delegated by the county society to the State Medical Society. In 1854 he was elected a permanent member of the State Medical Society. In 1847 he attended as a delegate the first meeting of the American Medical Association, which he assisted in organising. The same year he was prominent in the organisation of the Medical Association of Southern Central New York, of which, in after years, he was at one time president, and always a very active and industrious member, contributing at every meeting papers of greater or less interest. He afterwards became a member of the Central New York Medical Association, and has been honored with its presidency. In 1865 he was president of the New York State Medical Society.

At the opening of the first session of the College of Medicine of Syracuse University, he delivered the general introductory lecture. In this address he spoke in the most hopeful and enthusiastic manner of what might be anticipated from the advanced methods of medical teaching, which the Faculty were proposing to adopt. He also reminded his colleagues of the weighty character of the duties and responsibilities which they had assumed, but that, with the iron purpose to work and never waver, success would be certain.

It was this mental trait in Dr. Hyde's make-up, to dare and to do, fortified by an imperious will and stimulated by a laudable ambition, that secured ultimate success.

The same untiring purpose carried him through the fifteen years of self-sacrificing devotion to the interests of the Medical Department of Syracuse University. To those who knew how much professional labor he performed at home, in town, and on distant consultation visits, often

by night, and in the performance of tedious and dangerous operations, and, in the meantime, making the journey once or twice a week to Syracuse, a distance of nearly thirty-five miles, in order to give his lectures in course, which, with few exceptions, were delivered with remarkable promptness and regularity, it has been a matter of surprise that he did not succumb to "weariness of the flesh" long before he did. His ambition and will, together with an enduring physique, will alone account for it. And yet all this was done so quietly that only his more intimate friends suspected the amount of it.

In 1876, the Centennial year, he was a delegate to the International Medical Congress, which met at Philadelphia in September, and before which he read a paper "On Incising the Sac in Herniotomy," which was published in the Transactions of that year.

In the summer of 1884, Dr. Hyde, having received the appointment from the American Medical Association of delegate to the International Medical Congress at Copenhagen, and also delegate to the British Medical Association at Belfast, Ireland, sailed from New York, accompanied by his wife, on the 19th of July, and in due time reached Queenstown, and proceeded to Belfast, where the British Association was in session. After the adjournment, they spent several days in visiting points of interest in the north of Ireland, and especially that wonderful geological display of basaltic columns constituting the Giant's Causeway. They then returned to Belfast, from whence they proceeded directly to Glasgow by steamer.

He spent a month in England and Scotland, visiting many famous places; but much of his time was spent in the great hospitals of London, Liverpool, Glasgow, and Edinburgh, and in visiting the great museums connected with the hospitals. He was also especially interested in the great Hunterian museum. He made the personal acquaintance of several of the celebrated surgeons connected with these hospitals, and mentioned in particular the name of Mr. Keith, of Edinburgh, whose views on antiseptic surgery corresponded so well with his own.

When the time came for him to go to Copenhagen, there were two or three considerations which influenced his choice in the matter between a visit to that city, where he expected to hear spoken mainly the French and the German languages, with which he was not familiar, and losing the privilege of even a hasty visit to the French capital. The choice fell on Paris, whither he went, and after a few days spent in "doing" it, he returned to London, and speedily set his face homeward, arriving in New York in the early part of September. These were red-letter days to him. His friends all rejoiced with him, and congratulated him on his safe return and the pleasure he had so highly enjoyed.

In the organisation of the New York State Medical Association in 1884 he was a prominent actor, and, as a member of the Council for

the first two years, gave much of his time and efficient energies to its work.

He attended the last meeting of the International Medical Congress, which took place at Washington early in September, 1887. He returned from Washington much elated with the success of the congress, and went to work, apparently with renewed courage. But to those of us who were accustomed to watch his movements, and knew that he was now already advanced in years, and knew, also, of certain local ailments, in themselves of a serious character, from which he had been suffering for several years, his signs of feebleness were more readily appreciated, and caused anxiety.

On the morning of Oct. 3, 1887, Dr. Hyde, with other surgeons, was called to the victim of a serious railroad injury. A thigh amputation became necessary, and instead of designating some stronger man to make the operation, as he might have done, he proceeded to the performance of the operation himself, with the assistance of others. But, as the sequel shows, the doctor must have summoned all his energies to the task—the last great effort of his life, as it proved to be.

The next morning I received a telegraphic message that he wished to see me.

He had suffered from an irritable bladder for some time, but it was now much worse. He was feeble and tottering, inclined to keep the lounge, and was evidently anxious about himself. Suspecting the presence of a considerable amount of residual urine, he wished to have the catheter introduced, but shrank from it, as with him it was as yet an untried operation. At his request, I consented to the postponement until the next morning, when the catheter was passed with ease, and about six ounces of urine were withdrawn, with a sense of relief. The urine was "muddy" and somewhat albuminous.

I will not stop to describe the case step by step, as it developed. Suffice it to say, that the signs of kidney and bladder implication became increasingly manifest, and after ten days he sank into a profound coma, passing away peacefully about 7 A. M., Oct. 15, 1887.

The various associations, societies, and institutions with which he had been connected passed resolutions of respect and condolence, and attended the funeral, either in a body or by delegations. Physicians from the neighboring cities and counties attended the funeral. Citizens of every class, from village and town and adjacent counties, crowded the house, lawn, and street, to pay the last honors to one so long known and so highly esteemed.

In therapeutics Dr. Hyde was rather conservative; but conservatism is the tendency of advanced life. He was cautious in the adoption of new remedies, and of the new methods of the administration of old ones. In antiseptic surgery he held prejudices that he never quite yielded. He saw, as did many others, the absurdities and discomforts of Listerism, as

first carried out in practice by the advocates of the new doctrine, and hence was slow in adopting that which was really good and true in its just and proper application by the advanced methods.

But in the practice of medicine proper he was a pioneer. He early adopted and advocated the supporting treatment of fevers, and was not afraid to feed his patients, or to give them cold water to drink. And this was years before others of his time saw the importance of the new views, and their applicability in the management of adynamic conditions. But he never forgot the remedies and therapeutic measures that had served him well in his early experience, and which ought not to lose their reputation in being displaced by some of the more recent substitutes of unestablished value.

In consultation he was, as a rule, preëminently courteous. This trait, beside the availability of his knowledge and judgment, added much to his consultation practice. While he did not always agree with the opinions of the attending physician, he generally made it a point in his duties as a consultant so skilfully to present his objections to the diagnosis of the attendant, or his dissent from the method of treatment, as to leave the reputation of the doctor untouched in the eyes of the patient or his family, while, at the same time, the patient received all the benefit that an honest consultation was designed to give.

Dr. Hyde was a frequent contributor to the literature of his profession. It seemed, often, to be from a sense of honorable obligation to sustain the interests of any society with which he was connected, that he offered his papers. While some of his published articles were only of local or temporary interest, many were of a more exhaustive character, and intended to convey the results of his wide and varied experience. Time and space will not allow of an enumeration of his various professional contributions.

It is to be regretted that the plan which he had marked out for his last winter's work could not have been accomplished. It was the preparation of a volume which should embody a record of his large experience, and for which he had preserved ample notes. It was his design to lay aside, in a large measure, the cares and fatigues of practice, and to give himself to the pleasures of quiet study and compilation in his comfortable home, in which occupation he anticipated the help of his most excellent and devoted wife, who was deeply interested in his plan, but whose high hopes and anticipations were destined to sad disappointment.

But while we deplore the failure of this design as a fitting termination of a life of great industry and of virtuous ambition, we may be thankful that so much good was accomplished in his long life that the plaudit of "Well done!" could be pronounced at last.

MEMOIR OF CHARLES G. POMEROY, M. D.

BY DARWIN COLVIN, M. D., OF WAYNE COUNTY.

During the brief period of time in which this Association has had an existence, the dark wing of the Destroyer has brushed against many of its most distinguished Fellows, and their lips are now voiceless. Among this number is CHARLES G. POMEROY, who was born in Madison county, of this state, on the 22d day of February, 1817.

At a very early age his parents emigrated to Ontario county, in this state, locating on a farm near the village of Canandaigua. His early education was obtained at the Canandaigua and Rochester academies. At the age of seventeen he entered the office of Dr. Post as a student in medicine, and at the age of twenty-one was granted a license to practise medicine and surgery by the Censors of Ontario County Medical Society.

After practising his profession a few months in Monroe county, he formed a copartnership with Dr. Alexander McIntyre, of Palmyra, Wayne county, at that time one of the most distinguished physicians and surgeons of the county.

After remaining a year with Dr. McIntyre, he changed his residence, going to the village of Fairville, in the same county, where he remained eight years, building up a reputation for medical and surgical skill which seldom falls to the lot of so young a practitioner.

Being anxious for a larger field for professional work, he, in 1845, again, and for the last time, changed his residence, going to the village of Newark in the same county, where he remained, and died on the 14th day of December, 1887.

I will not largely dilate upon the career of Dr. Pomeroy, as it would be but a repetition of what has so many times been said of those physicians and surgeons who occupied the highest positions in their profession in their own and the counties about them.

This much should especially be said: From his earliest professional life, he was intensely radical in his views and practices whenever the honor and dignity of his profession were assailed. Hypocrisy in anything never found a resting-place in him. He was blunt and outspoken at all times, when anything savoring in the slightest degree of quackery was the subject of conversation. He abominated a charlatan, and everything pertaining to him. I well remember the frequent interviews between him and myself a few weeks previous to the annual meeting of the state society in February, 1884. At one of the last of those conversations, I

distinctly recollect a remark which he made to me. Said he,—"Nothing but the listlessness of the country members can defeat the old code, yet I expect it, and should such be the case, I shall anxiously and persistently urge a quiet separation from those eye and corn doctors, and the formation of a new society, one that will be composed of noble and honorable men. Until then we cannot be happy."

He appeared to anticipate what I, at the time, could not think the profession would consent to. With alacrity he entered into the organisation of the State Association as one of its Founders, and remained a faithful Fellow up to his death.

He was one of the organisers of the Wayne County Medical Society, and often elected its president. He was a member of the American Medical Association, and at the formation of the Medical Association of Central New York he was elected one of the earlier presidents. At the reorganisation of "The New York State Custodial Asylum for Feeble-Minded Women," which is located at Newark, in this county, he was appointed by the governor one of its trustees, and the board urged upon him the position of physician to the institution, which, on account of failing health, he reluctantly accepted. He also became the treasurer of the institution, and continued as trustee, physician, and treasurer until compelled by impaired health to sever his relations with it.

Dr. Pomeroy as a surgeon ranked high in his county. He had made the operation of ovariotomy, and ligated the common carotid, beside a large number of other operations.

Dr. Pomeroy was twice married, losing his first wife in early life. By her he had one child, a daughter, now the wife of S. B. McIntyre, Esq., of Palmyra, one of the leading lawyers of the county. In 1850 he married his second wife, and as a result of that union a son was born, who became a lawyer, and who died a few weeks after his father.

Nearly the last four years of Dr. Pomeroy's life were more or less clouded with sadness. The writer accompanied him to Albany for the purpose of staying the hands of the destroyers of the old state society in February, 1884. On the night of his return from the meeting, he found his wife complaining of a slight cold. His professional advice being asked the following day at some distance from his home, he did not see her before the following night, she, in the interval, being observed by his assistant. During that night the results of an acute nephritis—suppression of urine accompanied with profound coma—had placed her beyond hope, and she died within forty-eight hours. After that terrible shock, she being a woman possessed of rare qualities and of infinite service to him, he was never fully himself again.

A year previous to his death it became plainly evident to all that his health was being rapidly undermined. He almost entirely abandoned his professional work; and six months before he died unmistakable evi-

dence of a granular disease of the kidneys, with cardiac complication, presented itself, and he died at the period here before mentioned.

The writer has never witnessed a greater expression of sorrow at the loss of a private citizen than was shown at the ceremonies attending his burial.

MEMOIR OF WM. G. STEVENSON, M. D.

BY E. H. SQUIBB, M. D., OF KINGS COUNTY.

(From notes furnished by Mrs. Wm. G. Stevenson.)

Dr. Wm. G. Stevenson died of consumption at 8:30 A. M. on Friday, February 3, 1888, at his late residence in Nyack, Rockland county, N. Y. He was but forty-four years of age when he died, and had led a most eventful life. He was a son of Rev. J. M. Stevenson, Secretary of the American Tract Society, and was born in Troy, Ohio. He graduated at Bellevue Medical College, New York city, in 1864, and was for some time an assistant to Dr. J. R. Wood, of Bellevue hospital.

At the breaking out of the war he was in the South, and was pressed into the Confederate service, serving for a short time on the staff of Gen. Breckenridge. As soon as an opportunity offered, he crossed the lines and came North, and for some time acted as a scout in the Federal army. During this period he passed a most eventful life, and carried to his grave wounds received in service. He spent some time in the West, and here again passed through many exciting scenes.

A sister of Dr. Stevenson married Rev. Francis L. Patton, D. D., LL. D., at present a professor in Princeton college. Dr. Patton was pastor of the Presbyterian church in Nyack some twenty years ago, and the deceased went there on a visit. He liked the place so well that he concluded to remain, and engaged in the practice of his profession. He was only twenty-four years of age then, and of a prepossessing appearance. He built up quite a large practice.

He married Mrs. Elsie, widow of Dr. Frank Hasbrouck, and daughter of the late Peter De Pew. Three years ago he was elected coroner of Rockland county, and last fall was reëlected to the same office, performing the duties faithfully.

The life story of Dr. Stevenson, if written out, would make a book full of romance and exciting details. He began a real life when but a boy, and had his full share of the vicissitudes of that life. He possessed marked natural abilities, and a memory that was little less than wonderful. A great reader and a close student, nothing escaped him, but everything was laid up for use when the time came.

He did much literary work, and of late years seemed to prefer this to his profession. One of his productions of interest was a little book, which was published in New York in 1864, entitled " Thirteen Months

in the Rebel Army," giving a sketch of his experience. It says that he went South at the beginning of 1861, expecting to teach school. He fell into the hands of the enemy, and had a narrow escape from lynching on account of supposed anti-slavery feelings. To settle the difficulty, he was forced to enlist, and soon found himself a high private in the Second Tennessee Volunteers. He goes on graphically to depict his life in the Southern army. He describes the battle of Belmont, his transfer to the ordnance department, and his sensations upon finding himself called upon to run an engine at the head of twenty-five cars loaded with a thousand men, and tells us of the collision which followed. Later he was transferred to the cavalry service, and served under John Morgan, whose mode of warfare he describes in detail, and was then promoted and transferred to the staff of Gen. Breckenridge. In this position he led a party of scouts, doing considerable active duty. He describes the council of war held previous to the battle of Shiloh, and gives a full and detailed account of the battle. All this time he was trying to discover some way to escape and cross the lines, which he finally accomplished and reached the North. The little book is full of interesting war incidents.

Few men were better known in his section than Dr. Stevenson, and his familiar face and form will long be missed. He was a man of scholarly attainments, both as regards his profession and otherwise. Although of late years he had almost retired from active practice, his opinions as a surgeon and a physician were frequently sought. While apparently strong willed, he could be led like a child by those in whom he had confidence. Taken in his prime from the scene of earthly labor, he will ever be remembered warmly by the friends who knew him best, and leave an aching void in the hearts of those who loved him most. All in all, he was a man you meet with only once in a decade.

MEMOIR OF WILLIAM C. PRYER, M. D.

BY WILLIAM L. WELLS, M. D., OF WESTCHESTER COUNTY.

Dr. William Chardavoyne Pryer, born in New York city, 1834, died at New Rochelle, September 24, 1888.

In early life Dr. Pryer met with an accident which was followed by a very tedious confinement. A little later in life he was again injured while sailing his yacht, and this injury developed a hip disease which made him an almost constant sufferer during the remainder of his life. Notwithstanding his impaired physical condition and suffering, he determined to pursue a classical education, and entered Columbia college, New York city. When near completing his collegiate course, he was forced by ill-health to relinquish all study and give his whole attention to the restoration of his health.

He made a choice of medicine as his profession, and pursued the study of it with uncommon assiduity under the late James R. Wood. While yet a student, he became an accomplished anatomist and dissector, and contributed to "Wood's Museum" many neat and elegant anatomical preparations. He graduated from the College of Physicians and Surgeons, New York city, in 1862. He then entered Bellevue hospital, where he acted as house surgeon. During this period he often assisted his preceptor in his clinics and private practice. Dr. Wood told the writer that Dr. Pryer's thesis on "Hernia," presented at his graduation, showed such marked ability and mastery of the subject that he deemed it worthy of preservation, and had it neatly engrossed and placed in his library. The intimacy formed between preceptor and pupil ripened into a high regard and esteem, which continued uninterrupted to the time of Dr. Wood's death, a few years ago.

Soon after leaving Bellevue hospital, Dr. Pryer entered the United States service as acting assistant surgeon, and was stationed at the De Camp hospital, David's Island, New York harbor. Here he had charge of the surgical section, and rendered efficient service, for which his early training and hospital experience especially fitted him. His physical infirmities alone prevented him from becoming a commissioned officer. He continued in the service of his country until the close of the war, when he settled in New Rochelle, and began a successful medical career. His professional abilities were soon recognised, and he was rewarded by more than an ordinary share of private practice. From his attention and success as a physician, and his reputation with the public, he soon became known in

neighboring towns, where he had a large consultation work. Thus early introduced into an extensive practice, the activity of his disposition led him to forget that he was far from being a sound man, and that there was a limit to his endurance. His practice was often interrupted by illness. Though warned by friends, and by his own experience as to the fatigue and danger to which he was necessarily exposed, he never ceased to work unless confined to his home by sickness.

About six years before his death he met with still another accident. On his way to see a patient his horse became frightened, and the doctor was thrown from his buggy, injuring his already diseased hip and fracturing two of his ribs. This accident confined him to his bed for more than four months. From this date he never engaged in active practice, confining his services to a few friends and office work. He passed the last five months or more in bed, a constant and helpless sufferer. He was fully conscious of the inevitable result of his disease, bore his painful illness with remarkable calmness, and met the slow approaches of death with fortitude. On one occasion he said to the writer,—"My work is finished, and I prefer death to a useless life."

Dr. Pryer was one of the founders of the New York State Medical Association, and a member of the Westchester County Medical Society.

His endeavors to maintain the dignity and welfare of his profession were well known by his professional brethren and by the laity. "To the very last," said his pastor at his funeral, "he retained his intense interest in everything relating to his profession, and seemed as eager to learn of anything new in connection with it as when he was in active practice. When acute suffering had rendered him too weak to read, his delight was to have the medical journals read to him. His entire life and professional career show the triumph of will-power over bodily weakness and constant suffering. To the end his mind remained clear, and his faculties unimpaired; but finally his strength was utterly worn out, and the body could respond no longer to his strong will-power. His life slowly ebbed away, and his spirit returned to God who gave it."

MEMOIR OF DR. W. C. PRYER, OF NEW ROCHELLE.

BY EDMUND S. F. ARNOLD, M. D., OF NEW YORK COUNTY.

In the death of Dr. PRYER, the New York State Medical Association loses not only one of its founders, but one who, though debarred by physical ailments and severe suffering from participating actively in its work or attending its meetings, was, nevertheless, one of its most earnest and practical friends and well-wishers.

Dr. WILLIAM CHARDAVOYNE PRYER was born in New York city in 1834. Meeting with an accident in early life, from the effects of which he never recovered, and which made him an almost constant sufferer, he nevertheless achieved an honorable, even brilliant, position in the profession to which he devoted himself.

After a suitable preliminary education he entered Columbia college, but was prevented by ill-health from completing his academical career. He next devoted himself to medicine, pursuing his studies under the late Dr. James R. Wood, and at the age of twenty-eight graduated with honor from the College of Physicians and Surgeons in 1862. During a part of the time he acted as assistant to Dr. Wood in his clinics and private practice, and subsequently served as house surgeon in Bellevue hospital. These pursuits probably determined him in favor of surgery, in which department he showed marked ability. Leaving Bellevue in 1863, he entered the United States service, and was stationed at the military hospital at David's Island, where his services were highly appreciated.

At the close of the war, in 1865, he quitted the army, and, entering upon the private practice of his profession in New Rochelle, soon, in spite of much bodily infirmity, and, indeed, actual suffering, acquired a wide reputation and extensive practice, both consulting and operative. Ever anxious to maintain the dignity of the profession, he was one of the founders of the New York State Medical Association, in which to the last he took a warm interest. On the establishment of the library he was among the first to give a valuable collection of books, and shortly after gave to the Association a hundred dollars in money. Although at this time a confirmed invalid, and almost wholly confined to the house, his interest never flagged, and he would remark, "I shall probably do more before long." At his death the balance of his medical books was given to the library, together with the handsome gift of $2,000, to be applied for the purposes of the same.

In 1869 Dr. Pryer became a member of the Presbyterian church, and

ever manifested himself a sincere and earnest Christian. The Rev. Dr. Waller, at his funeral, remarked of him,—"His entire life and brilliant professional career show the triumph of will-power over bodily weakness and constant suffering. To the end his mind remained clear and his faculties unimpaired; but finally his strength was utterly worn out, and the body could no longer respond to the strong will-power. His life slowly ebbed away, and his spirit returned to God who gave it." This event took place on September 24, 1888; and great as was the loss to a wide circle of mourning friends, to him it could not be otherwise than a long-wished-for consummation.

No better evidence of his energy and zealous devotion to his profession can be afforded than the fact that, though at all times suffering more or less acutely from serious hip-joint disease, he bravely followed the path of professional duty, and succeeded in building up a large and valuable practice.

His characteristics, more especially during the last years, have been so admirably summed up by one of his relatives, and give such an insight into the whole character of the man, that, in conclusion, I will quote without alteration: "In his later years, excluded from active participation in any public matters, his interest in all ever remained the same. He was compelled to find his pleasures almost exclusively in his own home. Fortunately his tastes were such as could be cultivated in retirement and lend color to a life deprived of so much. He read largely on all topics, and his mind was stored with a great variety of information which his retentive memory rendered available at all times. His ability to concentrate his thoughts on any subject presented to him, even in the midst of the greatest physical suffering, was to me, who saw it constantly and to the last, simply marvellous.

"With the full knowledge of his condition, and that the battle must end in defeat, there was no complaint, but a cheerful and hopeful courage throughout till healed by the Great Physician."

Dr. Pryer never married, but all that could be done to render a life so afflicted endurable, even cheerful, was effected by the ministrations of a loving and devoted sister.

LIST OF FELLOWS

BY DISTRICT AND COUNTY.

FIRST OR NORTHERN DISTRICT.

FRANKLIN COUNTY.

Founder. Gillis, William. Fort Covington.

1

FULTON COUNTY.

Original. Blake, Clarence R. Northville.
Founder. de Zouche, Isaac. Gloversille.
Edwards, John. Gloversville.

3

HAMILTON COUNTY.

McGann, Thomas. Wells.

1

HERKIMER COUNTY.

Casey, J. E. Mohawk.
Douglass, A. J. Ilion.
Ellis, J. B. Little Falls.
Fox, Eli. Mohawk.
Garlock, William D. Little Falls.
Original. Glidden, Charles H. Little Falls.
Green, H. H. Paine's Hollow.
Original. Potter, Vaughn C. Starkville.
Original. Sharer, John P. Little Falls.
Original. Southworth, Mark A. Little Falls.
Original. Young, John D. Starkville.

11

JEFFERSON COUNTY.

Founder. Abell, Ira H. Antwerp.
Founder. Crawe, J. Mortimer. Watertown.

Founder. Johnson, Charles M. Watertown.
Original. Johnson, Parley H. Adams.
Miller, J. H. Carthage.

5

LEWIS COUNTY.

Crosby, Alexander H. Lowville.
Douglass, Charles E. Constableville.
Joslin, Albert A. Martinsburgh.
Kelly, John D. Lowville.
Kilborn, Henry F. Croghan.

5

MONTGOMERY COUNTY.

Original. Ayres, Douglas. Fort Plain.
Original. Biggam, William H., Jr. Fort Plain.
French, S. H. Amsterdam.
Original. Graves, Ezra. Amsterdam.
Original. Johnson, Richard G. Amsterdam.
Klock, Charles M. St. Johnsville.
Original. Leach, H. M. Glen.
Parr, John. Buel.
Parsons, W. W. D. Fultonville.
Founder. Robb, William H. Amsterdam.
Original. Rulison, Elbert T. Amsterdam.
Simmons, Frank E. Canajoharie.
Smeallie, James A. Canajoharie.
Smyth, Arthur V. H. Minaville.

14

ONEIDA COUNTY.

Armstrong, James A. Clinton.
Babcook, H. E. New London.
Original. Bagg, Moses M. Utica.
Barnum, D. Albert. Cassville.
Original. Blumer, G. Alder. Utica.
Bond, George F. M. Utica.
Original. Booth, Wilbur H. Utica.
Original. Brush, Edward N. Utica.
Churchill, Alonzo. Utica.
Clarke, Wallace. Utica.
Crim, Frank D. Utica.
Dodge, Amos P. Oneida Castle.
Douglass, James W. Booneville.

English, G. P. Booneville.
Flandrau, Thomas M. Rome.
Fraser, Jefferson C. Ava.
Fuller, Earl D. Utica.
Gibson, William M. Utica.
Glass, James H. Utica.
Gray, John P. Utica.
Holden, Arthur L. Utica.
Hughes, Henry R. Clinton.
Original. Hunt, James G. Utica.
Kuhn, William. Rome.
Munger, Charles. Knoxboro.
Nelson, William H. Taberg.
Palmer, Henry C. Utica.
Palmer, Walter B. Utica.
Phelps, George G. Utica.
Original. Pilgrim, Charles W. Utica.
Founder. Porter, Harry N. N. Y. Mills.
Quin, Hamilton S. Utica.
Reid, Christopher C. Rome.
Roberts, John L. D. N. Y. Mills.
Russell, Charles P. Utica.
Spicer, Walter E. Holland Patent.
Sutton, H. C. Rome.
Sutton, Richard E. Rome.
Swartwout, Leander. Prospect.
Tefft, Charles B. Utica.
Wagner, Charles Gray. Utica.
West, Joseph E. Utica.
West, M. Calvin. Rome.

43

OSWEGO COUNTY.

Bacon, Charles G. Fulton.
Bates, Nelson W. Central Square.
Cooley, R. N. Hannibal Centre.
Original. De Witt, Byron. Oswego.
Dowd, Pascal M. Oswego.
Drake, D. Delos. Central Square.
Original. Hall, William A. Fulton.
Huntington, John W. Mexico.
Johnson, George P. Mexico.
Marsh, E. Frank. Fulton.
Nelson, George W. Orwell.

Todd, John B. Parish.
Original. Tully, A. Melville. Oswego.
13

ST. LAWRENCE COUNTY.

Cook, Guy Reuben. Louisville.
1

SECOND OR EASTERN DISTRICT.

ALBANY COUNTY.

Founder. Bailey, Theodore P. Albany.
Original. Houston, David W. Cohoes.
Founder. Peters, Samuel. Cohoes.
Founder. *Sabin, Robert H. West Troy.
Founder. Sabin, William B. West Troy.
Original. Van Vranken, Adam T. West Troy.
6

CLINTON COUNTY.

Founder. Dodge, Lyndhurst C. Rouse's Point.
Original. Howe, Edwin S. Au Sable Forks.
Founder. Lyon, E. M. Plattsburgh.
3

COLUMBIA COUNTY.

Original. Bates, Xyris T. New Lebanon.
Original. Benham, John C. Hudson.
Original. Lockwood, J. W. Philmont.
Original. Smith, H. Lyle. Hudson.
Founder. Wilson, Thomas. Claverack.
Woodworth, T. Floyd. Kinderhook.
6

ESSEX COUNTY.

Founder. Barton, Lyman. Willsborough.
Church, Charles A. Bloomingdale.
Original. D'Avignon, Francis J. Au Sable Forks.

Founder. Edgerly, Edward F. Moriah Centre.
Original. La Bell, Martin J. Lewis.
Original. Pollard, Abiather. Westport.
Original. Rand, Hannibal W. Keene.
Original. Rice, Isaac. Bloomingdale.
Original. Riley, Andrew W. Au Sable Forks.
Original. Robinson, Ezra A. Jay.
Original. Turner, Melvin H. Hammondsville.
11

GREENE COUNTY.

Original. Conkling, George. Durham.
Getty, A. H. Athens.
Original. Selden, O. G. Catskill.
Original. Selden, Robert. Catskill.
4

RENSSELAER COUNTY.

Original. Allen, Amos. Grafton Centre.
Founder. Allen, Charles S. Greenbush.
Allen, William L. Greenbush.
Original. Baynes, William T. Troy.
Founder. Bonesteel, William N. Troy.
Original. Bontecou, Reed B. Troy.
Original. Bucklin, Daniel D. Lansingburgh.
Founder. Burbeck, Charles. H. Troy.
Founder. Burton, Matthew H. Troy.
Case, M. W. Troy.
Original. Cooper, William C. Troy.
Founder. Cooper, William S. Troy.
Original. Crombie, Walter C. Schaghticoke.
Founder. Ferguson, Everard D. Troy.
Founder. Finder, William. Troy.
Founder. Hannan, James C. Hoosick Falls.
Founder. Harvie, J. B. Troy.
Original. Heimstreet, Thomas B. Troy.
Keith, Halbert Lyon. West Sand Lake.
Original. Lester, Sullivan W. Troy.
Original. Lyon, George E. Troy.
Original. *McTammany, William F. Troy.
Original. Magee, Daniel. Troy.
Marsh, James P. Troy.
Founder. Mitchell, Howard E. Troy.

Founder. Nichols, Calvin E. Troy.
Founder. Nichols, William H. West Sand Lake.
Original. Rogers, S. Frank. Troy.
Founder. Rosseau, Zotique. Troy.
Founder. Seymour, W. Wotkyns. Troy.
Original. Skinner, Smith A. Hoosick Falls.
Sweetman, J. T., Jr. Troy.
Original. Traver, Richard D. Troy.
Ward, R. H. Troy.
Original. *Winship, Cornelius A. Eagle Mills.

35

SARATOGA COUNTY.

Founder. Babcock, Myron N. Saratoga Springs.
Founder. Comstock, George F. Saratoga Springs.
Founder. Creal, Charles E. Saratoga Springs.
Curtis, P. C. Round Lake.
Original. Dunlop, John J. Waterford.
Founder. Grant, Charles S. Saratoga Springs.
Original. Hall, William H. Saratoga Springs.
Founder. Hodgman, William H. Saratoga Springs.
Hudson, George. Stillwater, Saratoga Co.
Inlay, Erwin G. Conklingville.
Original. Johnson, Ianthus G. Greenfield Centre.
Keefer, Charles W. Mechanicsville.
Kniskern, A. C. Mechanicsville.
Founder. McEwen, Robert C. Saratoga Springs.
Moriarta, D. C. Saratoga Springs.
Original. Preston, John R. Schuylerville.
Founder. Reynolds, Tabor B. Saratoga Springs.
Original. Sherer, John D. Waterford.
Sherman, F. J. Ballston.
Original. Stubbs, Roland H. Waterford.

20

SCHENECTADY COUNTY.

Founder. *De La Mater, Stephen G. Duanesburg.
Ennis, Alexander. Pattersonville.
Fuller, Robert. Schenectady.
Hammer, Charles. Schenectady.
Original. McDonald, George E. Schenectady.
Original. Reagles, James R. Schenectady.

	Steinführer, Gustavus A. F. Schenectady.
Original.	Van Zandt, Henry C. Schenectady.
	8

SCHOHARIE COUNTY.

Original.	Hagadorn, William. Gilboa.
Original.	Kingsley, Henry F. Schoharie.
	2

WARREN COUNTY.

Original.	Barney, Charles S. Glens Falls.
Original.	Ferguson, James. Glens Falls.
	Fitzgerald, David J. Glens Falls.
Original.	Martine, Godfrey R. Glens Falls.
	4

WASHINGTON COUNTY.

	Lambert, John. Salem.
	Long, Alfred J. Whitehall.
	2

THIRD, OR CENTRAL DISTRICT.

BROOME COUNTY.

	Allen, S. P. Whitney's Point.
Founder.	Chittenden, Joseph H. Binghamton.
Original.	Ely, Henry Oliver. Binghamton.
	Farrington, John M. Binghamton.
	Greene, Clark W. Chenango Forks.
Original.	*Hall, Henry C. Leslie.
Original.	Hills, Lyman H. Binghamton.
	Knapp, W. H. Union Centre.
	McFarland, S. F. Binghamton.
	Meacham, Isaac D. Binghamton.
Founder.	Orton, John G. Binghamton.
	Pierce, Edward A. Binghamton.
	Pierson, G. E. Kirkwood.
Founder.	Putnam, Frederick W. Binghamton.
Original.	Race, W. F. Binghamton.

Founder.	Richards, Charles B.	Binghamton.
	Wells, E. H.	Binghamton.
		17

CAYUGA COUNTY.

Original.	Kenyon, M.	Moravia.
Original.	Laird, William R.	Auburn.
Founder.	Sawyer, Conant.	Auburn.
		3

CHEMUNG COUNTY.

Original.	Brown, Charles W.	Elmira.
	Morrell, Isaac.	Elmira.
Original.	Price, John H.	Elmira.
Original.	Ross, Frank W.	Elmira.
	Squire, Charles L.	Elmira.
	Squire, J. H.	Elmira.
Original.	Wales, Theron A.	Elmira.
		7

CHENANGO COUNTY.

Founder.	*Avery, George W.	Norwich.
Original.	Blair, Louis P.	McDonough.
Original.	Brooks, Leroy J.	Norwich.
	Copley, Herman D.	Bainbridge.
	Guy, John D.	Coventry.
	Hand, S. M.	Norwich.
	Hayes, Philetus A.	Afton.
Original.	Johnson, Leonard M.	Greene.
Original.	Lyman, Elijah S.	Sherburne.
Original.	Lyman, H. C.	Sherburne.
	Packer, Thurston G.	Smyrna.
	Smith, Samuel L.	Smithville.
	Thompson, R. A.	Norwich.
	Van Wagner, L. A.	Sherburne.
		14

CORTLAND COUNTY.

	Bradford, George D.	Homer.
Original.	Clark, DeWitt.	Marathon.
	Didama, E. A.	Cortland.
Founder.	Green, Caleb.	Homer.

	Halbert, M. L. Cincinnatus.
Founder.	Hendrick, Henry C. McGrawville.
	Higgins, F. W. Cortland.
Founder.	Jewett, Homer O. Cortland.
	Kenyon, Benjamin. Cincinnatus.
Original.	Smith, Marcellus R. Cincinnatus.
Original.	Tripp, John D. Virgil.
	11

DELAWARE COUNTY.

Original.	Allaben. Orson M. Margaretville.
	Morrow, William B. Walton.
	Smith, George C. Delhi.
	Travis, Edward M. Masonville.
Original.	Young, Oscar H. Sidney Centre.
	5

MADISON COUNTY.

Original.	Birdsall, Gilbert. N. Brookfield.
	Burhyte, O. W. Brookfield.
	Cavana, Martin. Oneida.
Original.	Carpenter, Henry W. Oneida.
	Drake, Frank C. Oneida.
Original.	Nicholson, A. R. Madison.
	Ure, Herman D. Wampsville.
	7

ONONDAGA COUNTY.

Original.	Aberdein, Robert. Syracuse.
Founder.	Allen, Henry B. Baldwinsville.
Original.	Cook, George W. Syracuse.
Founder.	Dallas, Alexander J. Syracuse.
Founder.	Didama, Henry D. Syracuse.
Original.	Donohue, Florence O. Syracuse.
	Earle, George W. Tully.
Founder.	Earll, George W. Skaneateles.
Original.	Edwards, Amos S. Syracuse.
Original.	Edwards, George A. Syracuse.
	Elder, J. S. Lysander.
Founder.	Elsner, Henry L. Syracuse.
	Frazee, A. Blair. Elbridge.
Original.	Gillette, Charles A. Syracuse.
Original.	Hatch, C. A. Syracuse.

Founder. Head, Adelbert D. Syracuse.
Original. Higgins, Seabury M. Memphis.
Original. Jacobson, Nathan. Syracuse.
Original. Knapp, Edwin A. Jamesville.
Founder. Kneeland, Jonathan. South Onondaga.
Original. Munson, W. W. Otisco.
Founder. Parsons, Israel. Marcellus.
Original. Saxer, Leonard A. Syracuse.
Stephenson, F. Halleck. Syracuse.
Founder. Van de Warker, Ely. Syracuse.
Original. Whitford, James. Onondaga Valley.

26

OTSEGO COUNTY.

Church, B. A. Oneonta.
Ford, M. L. Oneonta.
Founder. Leaning, John K. Fly Creek.
Original. Martin, John H. Otego.
Original. Merritt, George. Cherry Valley.
Original. Sweet, Joseph. Unadilla.
Sweet, Joshua J. Unadilla.

7

SCHUYLER COUNTY.

Broderick, William P. Havana.
Roper, P. B. Alpine.
Smelzer, Baxter T. Havana.

3

SENECA COUNTY.

Allison, Henry E. Willard.
Blaine, Myron D. Willard.
Founder. Lester, Elias. Seneca Falls.
Original. Rhodes, S. D. Seneca Falls.
Founder. Schoonmaker, E. J. Magee's Corners.
Seaman, Frank G. Seneca Falls.

6

TIOGA COUNTY.

Original. Ayer, W. L. Owego.
Cady, George M. Nichols.
Original. Eastman, Robert W. Owego.

3

TOMPKINS COUNTY.

Founder. Beers, John E. Danby.
Founder. Fitch, William. Dryden.
Flickinger, John. Trumansburg.
3

FOURTH OR WESTERN DISTRICT.

ALLEGHANY COUNTY.

Cottrell, A. W. Whitesville.
Original. Stephenson, James A. Scio.
Original. Wakely, Benjamin C. Angelica.
3

CATTARAUGUS COUNTY.

Ellsworth, Victor A. East Otto.
Lake, Albert D. Perrysburg.
Mudge, Selden J. Olean.
Original. Tompkins, Orren A. East Randolph.
4

CHAUTAUQUA COUNTY.

Founder. Ames, Edward. Sherman.
Founder. Chace, William. Mayville.
Original. Darling, Frank B. Westfield.
Founder. Dean, Harmon J. Brocton.
Founder. Strong, Thomas D. Westfield.
5

ERIE COUNTY.

Founder. Andrew, Judson B. Buffalo.
Original. Atwood, H. L. Collins Centre.
Original. Baker, Milan. Buffalo.
Original. Banta, Rollin L. Buffalo.
Original. *Barker, Arthur M. Buffalo.
Original. Bartlett, Frederick W. Buffalo.
Original. Barton, Bernard. Buffalo.
Original. Boies, Loren F. East Hamburgh.
Original. Briggs, Albert H. Buffalo.

	Brown, George L. Buffalo.
Original.	Burwell, George M. Buffalo.
Founder.	Cronyn, John. Buffalo.
Original.	Dagenais, Alphonse. Buffalo.
Original.	Daniels, Clayton M. Buffalo.
Original.	Dorland, Elias T. Buffalo.
	Fell, George E. Buffalo.
	Fowler, Joseph. Buffalo.
	Frederick, Carlton C. Buffalo.
	Gould, Cassius W. Buffalo.
	Granger, William D. Buffalo.
	Green, Stephen S. Buffalo.
Original.	Greene, De Witt C. Buffalo.
Founder.	Greene, Joseph C. Buffalo.
Original.	Greene, Walter D. Buffalo.
Original.	Harrington, D. W. Buffalo.
	Hayd, Herman E. Buffalo.
	Heath, William H. Buffalo.
Founder.	Hoyer, F. F. Tonawanda.
	Hubbell, Alvin A. Buffalo.
	Ingraham, Henry D. Buffalo.
	Jackson, William H. Springville.
Original.	Johnson, Thomas M. Buffalo.
Original.	*King, James E. Buffalo.
	Long, Ben. G. Buffalo.
Original.	Lynde, Uri C. Buffalo.
Original.	Murray, William D. Tonawanda.
	Park, Roswell. Buffalo.
Original.	Pettit, John A. Buffalo.
	Pohlman, Julius. Buffalo.
Original.	Putnam, James W. Buffalo.
	*Steele, Charles G. Buffalo.
	Stockton, Charles G. Buffalo.
	Strong, Orville C. Colden.
	Thornton, William H. Buffalo.
Founder.	Tremaine, William S. Buffalo.
	Trull, H. P. Williamsville.
Original.	Vaughn, Frank O. Buffalo.
	Wheeler, Isaac G. Marilla.
	Willoughby, M. Buffalo.
Founder.	Wyckoff, Cornelius C. Buffalo.

GENESEE COUNTY.

Original.	Crane, Frank W.	Corfu.
Founder.	Jackson, Albert P.	Oakfield.
Original.	McNamara, Daniel L.	Batavia.
Founder.	Sprague, William B.	Pavilion.
Founder.	Townsend, Morris W.	Bergen.
	Woodward, C. H.	Batavia.

6

LIVINGSTON COUNTY.

	Brown, J. P.	Tuscarora.
	Dodge, Frank B.	Mount Morris.
Founder.	*Gray, John W.	Avon.
	Jones, George H.	Fowlerville.
	Kneeland, B. T.	Dalton.
Original.	Menzie, R. J.	Caledonia.
Original.	Moyer, Frank H.	Moscow.

7

MONROE COUNTY.

Original.	Backus, Ogden.	Rochester.
	Briggs, C. M.	Fairport.
Original.	Briggs, William H.	Rochester.
Original.	Buckley, Charles.	Rochester.
Original.	Buckley, James.	Rochester.
Original.	Burke, John J. A.	Rochester.
Original.	*Collins, Thomas B.	Rochester.
Original.	Dunning, J. D.	Webster.
	Fenno, Henry M.	Rochester.
Original.	*Fuller, Winfield S.	Fairport.
Founder.	Hovey, B. L.	Rochester.
	Jones, S. Case.	Rochester.
	Maine, Alva P.	Webster.
	McDougall, William D.	Spencerport.
Founder.	Moore, Edward M.	Rochester.
Original.	Moore, Edward M., Jr.	Rochester.
Original.	Moore, Richard Mott.	Rochester.
	Nold, John B.	Rochester.
Original.	O'Hare, Thomas A.	Rochester.
Original.	Pease, Joseph.	Hamlin.
	Preston, B. I.	Rochester.

Founder.	Reynolds, R. C.	Pittsford.
	Snook, George.	Parma.

23

NIAGARA COUNTY.

Original.	Clark, Simeon T.	Lockport.
	Eddy, George P.	Lewiston.
	Huggins, William Q.	Sanborn.

3

ONTARIO COUNTY.

Original.	Allen, Duncan S.	Seneca.
Original.	Allen, James H.	Gorham.
Founder.	Bentley, Francis R.	Cheshire.
Original.	Budd, J. Henry.	Geneva.
	Cruttenden, Albert G.	Clifton Springs.
	De Laney, John Pope.	Geneva.
Original.	Hicks, W. Scott.	Bristol.
Founder.	Nichols, H. W.	Canandaigua.
Founder.	Simmons, E. W.	Canandaigua.
Founder.	Smith, Joseph T.	Canandaigua.
Original.	Vanderhoof, Frederick D.	Phelps.

11

ORLEANS COUNTY.

Original.	Bailey, William C.	Albion.
Original.	Barnum, Eugene E.	Waterport.
Founder.	Chapman, James.	Medina.
	Curtis, Daniel.	Jeddo.
Original.	Taylor, John H.	Holley.
Founder.	Tompkins, H. C.	Knowlesville.

6

STEUBEN COUNTY.

	Chittenden, Daniel J.	Addison.
Original.	Dunn, Jeremiah.	Bath.
Original.	Ellison, Metler D.	Canisteo.
	Fowler, Thomas B.	Cohocton.
	Hunter, Nathaniel P.	Jasper.
Original.	Jamison, John S.	Hornellsville.
Original.	Perry, Nathaniel M.	Troupsburgh.
	Robinson, Joseph W.	Hornellsville.
	Wallace, Edwin E.	Jasper.

9

WAYNE COUNTY.

Founder.	Arnold, J. Newton. Clyde.
Founder.	Colvin, Darwin. Clyde.
	Horton, David B. Red Creek.
Original.	Ingraham, Samuel. Palmyra.
	Lamont, John C. Sodus.
Original.	Landon, Newell E. Newark.
	Nutten, Wilbur F. Newark.
Original.	Sayers, Alexander. Marion.
Original.	Sprague, John A. Williamson.
	Sprague, L. S. Williamson.
Original.	Young, Augustus A. Newark.
	11

WYOMING COUNTY.

Original.	Ellinwood, A. G. Attica.
	Lusk, Zera J. Warsaw.
Original.	Palmer, George M. Pike.
Original.	Rae, Robert. Portageville.
	Rudgers, Denton W. Perry.
	5

YATES COUNTY.

Oliver, William. Penn Yan.
Smith, David M. Penn Yan.
2

FIFTH OR SOUTHERN DISTRICT.

DUTCHESS COUNTY.

	Baker, Benjamin N. Rhinebeck.
Original.	Barnes, Edwin. Pleasant Plains.
Original.	Bayley, Guy Carleton. Poughkeepsie.
	Bird, J. S. Hyde Park.
Founder.	Codding, George H. Amenia.
Founder.	Cramer, William. Poughkeepsie.
Original.	Fletcher, Charles L. Wing's Station.
	Howland, George T. Tivoli.
	Julian, John M. Moore's Mill.
Founder.	Kittredge, Charles S. Fishkill-on-Hudson.

Founder. Leroy, Irving D. Pleasant Valley.
Founder. Porteous, James G. Poughkeepsie.
Founder. Pultz, Monroe T. Stanfordville.
Original. Sutton, George Samuel. East Fishkill.
Original. Van Wyck, Richard C. Hopewell Junction.
Original. Young, John. Fishkill-on-Hudson.

16

KINGS COUNTY.

Original. *Andrews, John S. East New York.
Founder. Baker, George W. Brooklyn E. D.
Bell, A. Nelson. Brooklyn.
Benton, Stuart H. Brooklyn.
Bierwirth, Julius C. Brooklyn.
Original. Brundage, Amos H. Brooklyn.
Original. Conway, John Francis. Brooklyn.
Creamer, Joseph. Brooklyn, E. D.
Creamer, Joseph, Jr. Brooklyn, E. D.
Feeley, James F. Brooklyn, E. D.
Gardiner, William F. Brooklyn.
Original. Jenkins, John A. Brooklyn, E. D.
Jewett, F. A. Brooklyn.
Original. Leighton, Nathaniel W. Brooklyn.
Little, Frank. Brooklyn.
Original. Lloyd, T. Mortimer. Brooklyn.
Original. Lung, Jesse B. Brooklyn.
Original. McCollom, William. Brooklyn.
Original. Minard, E. J. Chapin. Brooklyn.
Original. Murray, S. J. Brooklyn.
Original. North, Nelson L. Brooklyn.
Original. Paine, Arthur R. Brooklyn.
Original. Pray, S. R. Brooklyn.
Risch, Henry F. Brooklyn.
Rochester, Thomas M. Brooklyn.
Founder. Rushmore, John D. Brooklyn.
Original. Russell, William G. Brooklyn.
Founder. Segur, Avery. Brooklyn.
Original. Shepard, A. Warren. Brooklyn.
Original. Sizer, Nelson Buell de S. Brooklyn.
Founder. Squibb, Edward H. Brooklyn.
Founder. Squibb, Edward R. Brooklyn.
Original. Steinke, Carl Otho Hermann. Brooklyn.
Sullivan, John D. Brooklyn.

Original. Thayer, Willam Henry. Brooklyn.
Vanderveer, J. R. Brooklyn.
Original. Wieber, George. Brooklyn.
Original. Williams, William H. Brooklyn.
Founder. Wyckoff, Richard M. Brooklyn.
39

NEW YORK COUNTY.

Agramonte, E. V. New York.
Original. Allen, S. Busby. New York.
Allen, Thomas H. New York.
Original. Arcularius, Lewis. New York.
Original. Arnold, Edmund S. F. New York.
Arnold, Glover C. New York.
Ballou, William R. New York.
Original. Bathgate, James. Morrisania, New York.
Benedict, Charles S. New York.
Original. Biggs, Herman M. New York.
Original. Blakeman, William N. New York.
Founder. Bozeman, Nathan. New York.
Bozeman, Nathan G. New York.
Original. Bryant, Joseph D. New York.
Original. Buchanan, Alexander. New York.
Original. Bull, Charles Stedman. New York.
Bull, William T. New York.
Original. Burchard, Thomas H. New York.
Founder. Cameron, Edward M. New York.
Founder. Carroll, Alfred Ludlow. New York.
Original. Carter, H. Skelton. New York.
Original. Chauveau, Jean F. New York.
Original. Chrystie, T. M. Ludlow. New York.
Collins, Stacy B. New York.
Comfort, John E. New York.
Founder. Conover, William S. New York.
Conway, John R., Jr. New York.
Original. Curry, Walker. New York.
Damainville, Lucien. New York.
Original. Denison, C. Ellery. New York.
Original. Denison, Ellery. New York.
Founder. Dennis, Frederic S. New York.
Founder. Detmold, William. New York.
Founder. Du Bois, Abram. New York.
Original. Du Bois, Matthew B. New York.
Dudley, A. Palmer. New York.

Original.	Eliot, Ellsworth. New York.
	Farrington, Joseph O. New York.
	Flinn, Thomas W. P. New York.
Founder.	Flint, Austin. New York.
Founder.	Flint, William H. New York.
	Foster, George V. New York.
	Frankenberg, Jacob H. New York.
Original.	Furman, Guido. New York.
Original.	Garrish, John P. New York.
	Gill, Charles R. New York.
	Gleitsmann, J. W. New York.
	Goldthwaite, Henry. New York.
Founder.	Gouley, John W. S. New York.
	Grauer, Frank. New York.
Original.	Harrison, George Tucker. New York.
Original.	Hills, S. Augden. New York.
Founder.	Hinton, John H. New York.
Founder.	Hodgman, Abbott. New York.
	Holmes, Martha C. New York.
	Hubbard, Dwight L. New York.
	Hubbard, George E. New York.
	Hubbard, Oliver P. New York.
Founder.	Hubbard, Samuel T. New York.
Original.	Ilgen, Ernest. New York.
Founder.	Janeway, Edward G. New York.
	Jenkins, William T. New York.
	Kearney, Thomas J. New York.
Founder.	Leale, Charles A. New York.
	Lewengood, Samuel. New York.
	Lewis, Robert. New York.
	Lockwood, Charles E. New York.
	Lukens, Anna. New York.
Founder.	Lusk, William T. New York.
	Lynch, Patrick J. New York.
	MacGregor, James R. New York.
	McIlroy, Samuel H. New York.
Founder.	McLeod, S. B. Wylie. New York.
Original.	McLochlin, James A. New York.
Original.	McNamara, Laurence J. New York.
	McTammany, George H. New York.
Founder.	Manley, Thomas H. New York.
	Matthews, David. New York.
	Meier, Gottlieb C. H. New York.
Original.	Miller, William T. New York.

Original.	Miranda, Ramon L. New York.
Original.	Mitchell, Hubbard W. New York.
Original.	Murphy, John. New York.
Original.	Murray, Byron J. New York.
	Newberry, John S. New York.
Original.	Newman, Robert. New York.
Founder.	Nicoll, Henry D. New York.
Original.	Oberndorfer, Isidor P. New York.
	O'Brien, Frederick Wm. New York.
	Ochs, Benjamin F. New York.
	Palmer, Edmund J. New York.
Original.	Parsons, John. New York.
	Perry, John Gardner. New York.
Original.	Pooler, Hiram A. New York.
Original.	Porter, P. Brynberg. New York.
Founder.	Purple, Samuel S. New York.
	Ransom, H. B. New York.
	Read, Ira B. New York.
Original.	Ricketts, Benjamin M. New York.
	Roth, Julius A. New York.
	Ruggles, Augustus D. New York.
Original.	Sabine, Gustavus A. New York.
	Sanders, E. New York.
Founder.	Sayre, Lewis A. New York.
Founder.	Sayre, Lewis Hall. New York.
	Sayre, Reginald H. New York.
	Shaw, Henry B. New York.
	Shrady, John. New York.
Original.	Skiff, George V. New York.
	Small, John W. New York.
Original.	Smith, J. Lewis. New York.
Original.	Smith, Samuel W. New York.
Original.	Smith, Stephen. New York.
Founder.	Taylor, Isaac E. New York.
Founder.	Thomas, T. Gaillard. New York.
	Truax, J. G. New York.
Founder.	Tucker, Carlos P. New York.
	Van Fleet, Frank. New York.
	Vincent, Ludger C. New York.
Original.	Wallach, Joseph G. New York.
	Walsh, Simon J. New York.
Founder.	Ward, Charles S. New York.
	Warner, John W. New York.
	Weston, Albert T. New York.

Founder. White, Whitman V. New York.
Founder. White, William T. New York.
Founder. Wiener, Joseph. New York.
Williamson, Edward A. New York.
Founder. Wood, Charles S. New York.
Original. Wyeth, John A. New York.

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ORANGE COUNTY.

Conner, Milton C. Middletown.
Original. Eager, William B. Middletown.
Original. Hunt, James H. Port Jervis.

3

PUTNAM COUNTY.

Founder. Murdock, George W. Cold Spring.
Founder. Young, William. Cold Spring.

2

QUEENS COUNTY.

Original. Burns, William J. Roslyn.
Original. Rave, Edward G. Oyster Bay.
Original. Webb, Edwin. Hempstead.

3

RICHMOND COUNTY.

Founder. Johnston, Francis U. New Brighton.
Martindale, F. E. Port Richmond.
Walser, Wm. C. Port Richmond.

3

ROCKLAND COUNTY.

Founder. Govan, William. Stony Point.
Stevenson, William G. Nyack.

2

SUFFOLK COUNTY.

Original. Banks, George B. Huntington.
Original. Chambers, Martin L. Port Jefferson.
Hamil, Edward H. Islip.
Hulse, William A. Bay Shore.
Original. Lindsay, Walter. Huntington.
Founder. Woodend, William D. Huntington.

6

SULLIVAN COUNTY.

Original. Bennett, Thomas W. Jeffersonville.
De Kay, William H. Parksville.
Original. Munson, J. A. Grahamsville.
3

ULSTER COUNTY.

Original. Chambers, Jacob. Kingston.
Original. HoornBeek, Philip Du Bois. Wawarsing.
Founder. Hühne, August. Rondout.
Original. Hühne, Frederick. Rondout.
Keefe, Christopher F. Rondout.
Original. Van Hoevenberg, Henry. Kingston.
Original. Ward, Stanley M. Ellenville.
7

WESTCHESTER COUNTY.

Acker, Thomas J. Croton Landing.
Ashton, Isaiah H. Dobbs Ferry.
Original. Brush, Edward F. Mount Vernon.
Original. Coutant, Richard B. Tarrytown.
Original. Furman, J. Henry. Tarrytown.
Original. Huntington, Henry K. New Rochelle.
Founder. Husted, Nathaniel C. Tarrytown.
Original. Lyons, G. A. New Rochelle.
Founder. *Pryer, William C. New Rochelle.
Original. Schmidt, H. Ernest. White Plains.
Original. Southworth, Richmond Joseph. Yonkers.
Original. Wells, William L. New Rochelle.
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SUMMARY OF FELLOWSHIP BY DISTRICT.

First District,	97
Second District,	101
Third District,	112
Fourth District,	145
Fifth District,	226
Total Fellowship,	681

ALPHABETICAL LIST OF FELLOWS.

Abell, Ira H., Antwerp, Jefferson Co. Founder.
Aberdein, Robert, 2 Greeley Block, Syracuse, Onondaga Co. Original.
Acker, Thomas J., Croton Landing, Westchester Co.
Agramonte, E. V., 435 W. 22d St., New York, New York Co.
Allaben, Orson M., Margaretville, Delaware Co. Original.
Allen, Amos, Grafton, Rensselaer Co. Original.
Allen, Charles S., Greenbush, Rensselaer Co. Founder.
Allen, Duncan S., Seneca, Ontario Co. Original.
Allen, Henry B., Baldwinsville, Onondago Co. Founder.
Allen, James H., Gorham, Ontario Co. Original.
Allen, S. Busby, 145 E. 83d St., New York, New York Co. Original.
Allen, S. P., Whitney's Point, Broome Co.
Allen, Thomas H., 52 W. 45th St., New York, New York Co.
Allen, William L., Greenbush, Rensselaer Co.
Allison, Henry E., Willard, Seneca Co.
Ames, Edward, Sherman, Chautauqua Co. Founder.
*Andrews, John S., 14 Pennsylvania Ave., Brooklyn, Kings Co. Original.
Andrews, Judson B., Buffalo Insane Asylum, Buffalo, Erie Co. Founder.
Arcularius, Lewis, 121 E. 25th St., New York, New York Co. Original.
Armstrong, James A., Clinton, Oneida Co.
Arnold, Edmund S. F., 53 W. 38th St., New York, New York Co. Original.
Arnold, Glover C., 115 E. 30th St., New York, New York Co.
Arnold, J. Newton, Clyde, Wayne Co. Founder.
Ashton, Isaiah H., Dobbs Ferry, Westchester Co.
Atwood, H. L., Collins Centre, Erie Co. Original.
*Avery, George W., Norwich, Chenango Co. Founder.
Ayer, W. L., Owego, Tioga Co. Original.
Ayres, Douglas, Fort Plain, Montgomery Co. Original.
Babcock, H. E., New London, Oneida Co. Original.
Babcock, Myron N., Saratoga Springs, Saratoga Co. Founder.
Backus, Ogden, 67 S. Fitzhugh St., Rochester, Monroe Co. Original.
Bacon, Charles G., Fulton, Oswego Co.
Bagg, Moses M., Utica, Oneida Co. Original.
Bailey, Theodore P., 90 Eagle St., Albany, Albany Co. Founder.

Bailey, William C., Albion, Orleans Co. Original.
Baker, Benjamin N., Rhinebeck, Dutchess Co.
Baker, George W., 540 Bedford Ave., Brooklyn, E. D.. Kings Co. Founder.
Baker, Milan, 471 Niagara St., Buffalo, Erie Co. Original.
Ballou, William R., Bellevue Hospital, New York, New York Co.
Banks, George B., Huntington, Suffolk Co. Original.
Banta, Rollin L., 330 Elk St., Buffalo, Erie Co. Original.
*Barker, Arthur M., 137 W. Tupper St., Buffalo, Erie Co. Original.
Barnes, Edwin, Pleasant Plains, Dutchess Co. Original.
Barnum, D. Albert, Cassville, Oneida Co.
Barnum, Eugene E., Waterport, Orleans Co. Original.
Barney, Charles S., Glens Falls, Warren Co. Original.
Bartlett, Frederick W., 112 Ellicott St., Buffalo, Erie Co. Original.
Barton, Lyman, Willsborough, Essex Co. Founder.
Bartow, Bernard, 220 Franklin St., Buffalo, Erie Co.
Bates, Nelson W., Central Square, Oswego Co.
Bates, Xyris T., New Lebanon, Columbia Co. Original.
Bathgate, James, Fordham Ave., Morrisania, New York, New York Co. Original.
Bayley, Guy Carleton, Poughkeepsie, Dutchess Co. Original.
Baynes, William T., 2419 5th Ave., Troy, Rensselear Co. Original.
Beers, John E., Danby, Tompkins Co. Founder.
Bell, A. Nelson, 113½ 2d Place, Brooklyn, Kings Co.
Benedict, Charles S., 339 W. 19th St., New York, New York Co.
Benham, John C., Hudson, Columbia Co. Original.
Bennett, Thomas W., Jeffersonville, Sullivan Co. Original.
Bentley, Francis R., Cheshire, Ontario Co. Original.
Benton, Stuart H., 1257 Bedford Ave., Brooklyn, Kings Co.
Bierwirth, Julius C., 130 Hicks St., Brooklyn, Kings Co.
Biggam, William H., Jr., Fort Plain, Montgomery Co. Original.
Biggs, Hermann M., 58 E. 25th St., New York, New York Co. Original.
Bird, J. S., Hyde Park, Dutchess Co.
Birdsall, Gilbert N., Brookfield, Madison Co. Original.
Blaine, Myron D., Willard, Seneca Co.
Blair, Louis P., McDonough, Chenango Co. Original.
Blake, Clarence R., Northville, Fulton Co. Original.
Blakeman, William N., 28 W. 37th St., New York, New York Co. Original.
Blumer, G. Alder, State Lunatic Asylum, Utica, Oneida Co. Original.
Boies, Loren F., East Hamburgh, Erie Co. Original.
Bond, G. F. M., Asylum, Utica, Oneida Co.
Bonesteel, William N., Mill St., Troy, Rensselaer Co. Founder.
Bontecou, Reed B., 82 4th St., Troy, Rensselaer Co. Original.

Booth, Wilbur H., 172 Genesee St., Utica, Oneida Co. Original.
Bozeman, Nathan, 9 W. 31st St., New York, New York Co. Founder.
Bozeman, Nathan G., 9 W. 31st St., New York, New York Co.
Bradford, George D., Homer, Cortland Co.
Briggs, Albert H., 267 Hudson St., Buffalo, Erie Co. Original.
Briggs, C. M., Fairport, Monroe Co.
Briggs, William H., 138 E. Main St., Rochester, Monroe Co. Original.
Broderick, William P., Havana, Schuyler Co.
Brooks, Leroy J., Norwich, Chenango Co. Original.
Brown, Charles W., 312 W. Church St., Elmira, Chemung Co. Original.
Brown, George L., 173 Niagara St., Buffalo, Erie Co.
Brown, J. P., Tuscarora, Livingston Co.
Brundage, Amos H., 609 Madison St., Brooklyn, Kings Co. Original.
Brush, Edward F., Mount Vernon, Westchester Co. Original.
Brush, Edward N., Penna. Hosp. for the Insane, Philadelphia, Penn. Original.
Bryant, Joseph D., 66 W. 35th St., New York, New York Co. Original.
Buchanan, Alexander, 358 W. 30th St., New York, New York Co. Original.
Buckley, Charles, 127 E. Main St., Rochester, Monroe Co. Original.
Buckley, James, 127 E. Main St., Rochester, Monroe Co. Original.
Bucklin, Daniel D., 575 2d Ave., Lansingburgh, Rensselaer Co. Original.
Budd, J. Henry, Geneva, Ontario Co. Original.
Bull, Charles Stedman, 47 W. 36th St., New York, New York Co. Original.
Bull, William T., 35 W. 35th St., New York, New York Co.
Burbeck, Charles H., 91 1st St., Troy, Rensselaer Co. Founder.
Burchard, Thomas H., 24 W. 40th St., New York, New York Co. Original.
Burhyte, O. W., Brookfield, Madison Co.
Burke, John J. A., 65 East Ave., Rochester, Monroe Co. Original.
Burns, William J., Roslyn, Queens Co. Original.
Burton, Matthew H., 75 4th St., Troy, Rensselaer Co. Founder.
Burwell, George N., 130 Pearl St., Buffalo, Erie Co. Original.
Cady, George M., Nichols, Tioga Co.
Cameron, Edward M., 22 W. 47th St., New York, New York Co. Founder.
Carpenter, Henry W., Oneida, Madison Co. Original.
Carroll, Alfred Ludlow, 30 W. 59th St., New York, New York Co. Founder.
Carter, H. Skelton, 130 E. 24th St., New York, New York Co. Original.
Case, M. W., 39 2d St., Troy, Rensselaer Co.
Casey, J. E., Mohawk, Herkimer Co.
Cavana, Martin, Oneida, Madison Co.

Chace, William, Mayville, Chautauqua Co. Founder.
Chambers, Jacob, Kingston, Ulster Co. Original.
Chambers, Martin L., Port Jefferson, Suffolk Co. Original.
Chapman, James, Medina, Orleans Co. Founder.
Chauveau, Jean F., 6 Ludlow Pl., New York, New York Co. Original.
Chittenden, Daniel J., Addison, Steuben Co.
Chittenden, Joseph H., Binghamton, Broome Co. Founder.
Chrystie, T. M., Ludlow, 216 W. 46th St., New York, New York Co. Original.
Church, B. A., Oneonta, Otsego Co.
Church, Charles A., Bloomingdale, Essex Co.
Churchill, Alonzo, 189 Genesee St., Utica, Oneida Co.
Clark, De Witt C., Marathon, Cortland Co. Original.
Clark, Simeon Tucker, Lockport, Niagara Co. Original.
Clarke, Wallace, 136 Park Ave., Utica, Oneida, Co.
Codding, George H., Amenia, Dutchess Co. Founder.
Collins, Stacy B., 106 E. 35 St., New York, New York Co.
*Collins, Thomas B., 141 E. Main St., Rochester, Monroe Co. Original.
Colvin, Darwin, Clyde, Wayne Co. Founder.
Comfort, John E., 1315 Franklin Ave., New York, New York Co.
Comstock, George F., Saratoga Springs, Saratoga Co. Founder.
Conkling, George, Durham, Greene Co. Original.
Connor, Milton C., Middletown, Orange Co.
Conover, William S., 203 W. 135th St., New York, New York Co. Founder.
Conway, John Francis, 880 Bedford Ave., Brooklyn, Kings Co. Original.
Conway, John R., Jr., 14 Lexington Ave., New York, New York Co.
Cook, George W., Syracuse, Onondaga Co. Original.
Cook, Guy Reuben, Louisville, St. Lawrence Co.
Cooley, R. N., Hannibal Centre, Oswego Co.
Cooper, William C., 81 3d St., Troy, Rensselaer Co. Original.
Cooper, William S., 81 3d St., Troy, Rensselaer Co. Founder.
Copley, Herman D., Bainbridge, Chenango Co.
Cottrell, A. W., Myerstown, Lebanon Co., Pa.
Coutant, Richard B., Tarrytown, Westchester Co. Original.
Cramer, William, 136 Mansion St., Poughkeepsie, Dutchess Co. Founder.
Crane, Frank W., Corfu, Genesee Co. Original.
Crawe, J. Mortimer, Watertown, Jefferson Co. Founder.
Creal, Charles E., Saratoga Springs, Saratoga Co. Founder.
Creamer, Joseph, 154 Hewes St., Brooklyn, E. D., Kings Co.
Creamer, Joseph, Jr., 168 N. 6th St., Brooklyn, E. D., Kings Co.
Crim, Frank D., Lincoln, Nebraska.
Crombie, Walter C., Schaghticoke, Rensselaer Co. Original.
Cronyn, John, 55 W. Swan St., Buffalo, Erie Co. Founder.
Crosby, Alexander H., Lowville, Lewis Co.

Cruttenden, Albert G., Clifton Springs, Ontario Co.
Curry, Walker, 21 E. 61st St., New York, New York Co. Original.
Curtis, Daniel, Jeddo, Orleans Co.
Curtis, P. C., Round Lake, Saratoga Co.
Dagenais, Alphonse, 348 E. Eagle St., Buffalo, Erie Co. Original.
Dallas, Alexander J., 48 Warren St., Syracuse, Onondaga Co. Founder.
Damainville, Lucien, 251 W. 84th St., New York, New York Co.
Daniels, Clayton M., 82 N. Pearl St., Buffalo, Erie Co. Original.
Darling, Frank B., Westfield, Chautauqua Co. Original.
D'Avignon, Francis J., Au Sable Forks, Essex Co. Original.
Dean, Harmon J., Brocton, Chautauqua Co. Founder.
De Kay, William H., Parksville, Sullivan Co.
*De La Mater, S. G. Duanesburg, Schenectady Co. Founder.
De Laney, John Pope, Geneva, Ontario Co.
Denison, Charles Ellery, 124 W. 13th St., New York, New York Co. Original.
Denison, Ellery, 124 W. 13th St., New York, New York Co. Original.
Dennis, Frederic S., 542 Madison Ave., New York, New York Co. Founder.
Detmold, William, 38 E. 9th St., New York, New York Co. Founder.
De Witt, Byron, Oswego, Oswego Co. Original.
de Zouche, Isaac, Gloversville, Fulton Co. Founder.
Didama, Emory A., Cortland, Cortland Co.
Didama, Henry D., 112 S. Salina St., Syracuse, Onondaga Co. Founder.
Dodge, Amos P., Oneida Castle, Oneida Co.
Dodge, Frank B., Mount Morris, Livingston Co.
Dodge, Lyndhurst C., Rouse's Point, Clinton Co. Founder.
Donohue, Florence O., 54 S. Clinton St., Syracuse, Onondaga Co. Original.
Dorland, Elias T., 86 N. Division St., Buffalo, Erie Co. Original.
Douglass, A. J., Ilion, Herkimer Co.
Douglass, Charles E., Constableville, Lewis Co.
Douglass, James W., Booneville, Oneida Co.
Dowd, Pascal M., Oswego, Oswego Co.
Drake, D. Delos, Central Square, Oswego Co.
Drake, Frank C., Oneida, Madison Co.
Du Bois, Abram, 16 W. 30th St., New York, New York Co. Founder.
Du Bois, Matthew B., 41 W. 33d St., New York, New York Co. Original.
Dudley, A. Palmer, 640 Madison Ave., New York, New York Co.
Dunlop, John J., Waterford, Saratoga Co. Original.
Dunn, Jeremiah, Bath, Steuben Co. Original.
Dunning, J. D., Webster, Monroe Co. Original.
Eager, William B., Middletown, Orange Co. Original.
Earle, George W., Tully, Onondaga Co.
Earll, George W., Skaneateles, Onondaga Co. Founder.

Eastman, Robert W., Owego, Tioga Co. Original.
Eddy, George P., Lewiston, Niagara Co.
Edgerly, Edward F., Moriah Centre, Essex Co. Founder.
Edwards, Amos S., 367 N. Salina St., Syracuse, Onondaga Co. Original.
Edwards, George A., Catharine and Lodi Sts., Syracuse, Onondaga Co. Original.
Edwards, John, Gloversville, Fulton Co.
Elder, J. Stevens, 2613 Nicollet Ave., Minneapolis, Minn.
Eliot, Ellsworth, 48 W. 46th St., New York, New York Co. Original.
Ellinwood, A. G., Attica, Wyoming Co. Original.
Ellis, J. B., Little Falls, Herkimer Co.
Ellison, Metler D., Canisteo, Steuben Co. Original.
Ellsworth, Victor A., East Otto, Cattaraugus Co.
Elsner, Henry L., 308 N. Salina St., Syracuse, Onondaga Co. Founder.
Ely, Henry Oliver, Binghamton, Broome Co. Original.
English, G. P., Booneville, Oneida Co.
Ennis, Alexander, Pattersonville, Schenectady Co.
Farrington, John M., Binghamton, Broome Co.
Farrington, Joseph O., 1991 Madison Ave., New York, New York Co.
Feely, James F., 296 Lorimer St., Brooklyn, E. D., Kings Co.
Fell, George E., 72 Niagara St., Buffalo, Erie Co.
Fenno, Henry Marshall, 77 W. Main St., Rochester, Monroe Co.
Ferguson, E. D., 1 Union Place, Troy, Rensselaer Co. Founder.
Ferguson, James, Glens Falls, Warren Co. Original.
Finder, William, Jr., 2 Union Place, Troy, Rensselaer Co. Founder.
Fitch, William, Dryden, Tompkins Co. Founder.
Fitzgerald, David J., Glens Falls, Warren Co.
Flandrau, Thomas M., Rome, Oneida Co.
Fletcher, Charles L., Wing's Station, Dutchess Co. Original.
Flickinger, John, Trumansburg, Tompkins Co.
Flinn, Thomas W. P., 137 E. 28th St., New York, New York Co.
Flint, Austin, 14 W. 33d St., New York, New York Co. Founder.
Flint, William H., 37 E. 33d St., New York, New York Co. Founder.
Ford, M. L., Oneonta, Otsego Co.
Foster, George V., 109 E. 18th St., New York, New York Co.
Fowler, Joseph, 31 Church St., Buffalo, Erie Co.
Fowler, Thomas B., Cohocton, Steuben Co.
Fox, Eli, Mohawk, Herkimer Co.
Frankenberg, Jacob H., 142 E. 74th St., New York, New York Co.
Fraser, Jefferson C., Ava, Oneida Co.
Frazee, A. Blair, Elbridge, Onondaga Co.
Frederick, Carlton C., 64 Richmond Ave., Buffalo, Erie Co.
French, S. H., Amsterdam, Montgomery Co.
Fuller, Earl D., 66 Varick St., Utica, Oneida Co.

Fuller, Robert, Schenectady, Schenectady Co.
*Fuller, Winfield S., Fairport, Monroe Co. Original.
Furman, Guido, 125 W. 73d St., New York, New York Co. Original.
Furman, J. Henry, Tarrytown, Westchester Co. Original.
Gardiner, W. F., 162 Sixth Ave., Brooklyn, Kings Co.
Garlock, William D., Little Falls, Herkimer Co.
Garrish, John P., 400 W. 57th St., New York, New York Co. Original.
Getty, A. H., Athens, Greene Co.
Gibson, William M., 187 Genesee St., Utica, Oneida Co.
Gill, Charles R., 140 W. 95th St., New York, New York Co.
Gillette, Charles A., S. Salina and Castle Sts., Syracuse, Onondaga Co. Original.
Gillis, William, Fort Covington, Franklin Co. Founder.
Glass, James H., 170 Genesee St., Utica, Oneida Co.
Gleitsmann, J. W., 117 2d Ave., New York, New York Co.
Glidden, Charles H., Little Falls, Herkimer Co. Original.
Goldthwaite, Henry, Fifth Avenue Hotel, New York, New York Co.
Gould, Cassius W., 1428 Main St., Buffalo, Erie Co.
Gouley, John W. S., 324 Madison Ave., New York, New York Co. Founder.
Govan, William, Stony Point, Rockland Co. Founder.
Granger, William D., Asylum, Buffalo, Erie Co.
Grant, Charles S., Saratoga Springs, Saratoga Co. Founder.
Grauer, Frank, 326 W. 46th St., New York, New York Co.
Graves, Ezra, Amsterdam, Montgomery Co. Original.
Gray, John P., Utica, Oneida Co.
*Gray, John W., Avon, Livingston Co. Founder.
Green, Caleb, Homer, Cortland Co. Founder.
Green, H. H., Paine's Hollow, Herkimer Co.
Green, Stephen S., 384 Swan St., Buffalo, Erie Co.
Greene, Clark W., Chenango Forks, Broome Co.
Greene, De Witt C., Buffalo, Erie Co. Original.
Greene, Joseph C., 124 E. Swan St., Buffalo, Erie Co. Founder.
Greene, Walter D., 444 Elk St., Buffalo, Erie Co. Original.
Guy, J. D., Coventry, Chenango Co.
Hagadorn, William, Gilboa, Schoharie Co. Original.
Halbert, M. L., Cincinnatus, Cortland Co.
*Hall, Henry C., Leslie, Broome Co. Original.
Hall, William A., Minneapolis, Minn. Original.
Hall, William H., Saratoga Springs, Saratoga Co. Original.
Hamill, Edward H., Newark, New Jersey.
Hammer, Charles, Schenectady, Schenectady Co.
Hand, S. M., Norwich, Chenango Co.
Hannan, James C., Hoosick Falls, Rensselaer Co. Founder.

Harrington, D. W., 1430 Main St., Buffalo, Erie Co. Original.
Harrison, George Tucker, 221 W. 23d St., New York, New York Co. Original.
Harvie, J. B., 565 1st St., Troy, Rensselaer Co. Founder.
Hatch, C. A., 6 E. Onondaga St., Syracuse, Onondaga Co. Original.
Hayd, Herman E., 9 Niagara St., Buffalo, Erie Co.
Hayes, Philetus A., Afton, Chenango Co.
Head, Adelbert D., Syracuse, Onondaga Co. Founder.
Heath, William H., 415 Pearl St., Buffalo, Erie Co.
Heimstreet, Thomas B., 14 Division St., Troy, Rensselaer Co. Original.
Hendrick, Henry C., McGrawville, Cortland Co. Founder.
Hicks, W. Scott, Bristol, Ontario Co. Original.
Higgins, F. W., Cortland, Cortland Co.
Higgins, Seabury M., Memphis, Onondaga Co. Original.
Hills, Lyman H., Binghamton, Broome Co. Original.
Hills, Samuel Augden, 53 E. 123d St., New York, New York Co. Original.
Hinton, John H., 41 W. 32d St., New York, New York Co. Founder.
Hodgman, Abbott, 141 E. 38th St., New York, New York Co. Founder.
Hodgman, William H., 109 Caroline St., Saratoga Springs, Saratoga Co. Founder.
Holden, Arthur L., 116 South St., Utica, Oneida Co.
Holmes, Martha C., 13 W. 125th St., New York, New York Co.
HoornBeek, Philip Du Bois, Warwarsing, Ulster Co. Original.
Horton, David B., Red Creek, Wayne Co.
Houston, David W., 62 Oneida St., Cohoes, Albany Co. Original.
Hovey, B. L., 34 N. Fitzhugh St., Rochester, Monroe Co. Founder.
Howe, Edwin S., Au Sable Forks, Essex Co. Original.
Howland, George T., Tivoli, Dutchess Co.
Hoyer, F. F., Tonawanda, Erie Co Founder.
Hubbard, Dwight L., 344 W. 33d St., New York, New York Co.
Hubbard, George E., 1701 Broadway, New York, New York Co.
Hubbard, Oliver P., 65 W. 19th St., New York, New York Co.
Hubbard, Samuel T., 27 W. 9th St., New York, New York Co. Founder.
Hubbell, Alvin A., 212 Franklin St., Buffalo, Erie Co.
Hudson, George, Stillwater, Saratoga Co.
Huggins, William Q., Sanborn, Niagara Co.
Hughes, Henry R., Clinton, Oneida Co.
Hühne, August, Rondout, Ulster Co. Founder.
Hühne, Frederick, Rondout, Ulster Co. Original.
Hulse, William A., Bay Shore, Suffolk Co.
Hunt, James G., 5 Gardner Block, Utica, Oneida Co. Original.
Hunt, James H., Port Jervis, Orange Co. Original.
Hunter, Nathaniel P., Jasper, Steuben Co.
Huntington, Henry K., New Rochelle, Westchester Co. Original.

Huntington, John W., Mexico, Oswego Co.
Husted, Nathaniel C., Tarrytown, Westchester Co. Founder.
Ilgen, Ernest, 213 E. 17th St., New York, New York Co. Original.
Ingraham, Henry D., 405 Franklin St., Buffalo, Erie Co.
Ingraham, Samuel, Palmyra, Wayne Co. Original.
Inlay, Erwin G., Conklingville, Saratoga Co.
Jackson, Albert P., Oakfield, Genesee Co. Founder.
Jackson, William H., Springville, Erie Co.
Jacobson, Nathan, 114 S. Salina St., Syracuse, Onondaga Co. Original.
Jamison, John S., Hornellsville, Steuben Co. Original.
Janeway, Edward G., 51 E. 25th St., New York, New York Co. Founder.
Jenkins, John A., 150 Milton St., Brooklyn, E. D., Kings Co. Original.
Jenkins, William T., 113 E. 26th St., New York, New York Co.
Jewett, F. A., 334 Madison St., Brooklyn, E. D., Kings Co.
Jewett, Homer O., Cortland, Cortland Co. Founder.
Johnson, Charles M., Watertown, Jefferson Co. Founder.
Johnson, George P., Mexico, Oswego Co.
Johnson, Ianthus G., Greenfield Centre, Saratoga Co. Original.
Johnson, Leonard M., Greene, Chenango Co. Original.
Johnson, Parley H., Adams, Jefferson Co. Original.
Johnson, Richard G., Amsterdam, Montgomery Co. Original.
Johnson, Thomas M., 309 Main St., Buffalo, Erie Co. Original.
Johnston, Francis U., New Brighton, Richmond Co. Founder.
Jones, George H., Fowlerville, Livingston Co.
Jones, S. Case, 34 N. Fitzhugh St., Rochester, Monroe Co.
Joslin, Albert A., Martinsburgh, Lewis Co.
Julian, John M., Moore's Mill, Dutchess Co.
Kearney, Thomas J., 107 Lexington Ave., New York, New York Co.
Keefe, Christopher F., Rondout, Ulster Co.
Keefer, Charles W., Mechanicsville, Saratoga Co.
Keith, Halbert Lyon, West Sand Lake, Rensselaer Co.
Kelly, John Devin, Lowville, Lewis Co.
Kenyon, Benjamin, Cincinnatus, Cortland Co.
Kenyon, M., Moravia, Cayuga Co. Original.
Kilborn, Henry F., Croghan, Lewis Co.
*King, James E., 16 E. Seneca St., Buffalo, Erie Co.
Kingsley, Henry F., Schoharie, Schoharie Co. Original.
Kittredge, Charles S., Fishkill-on-Hudson, Dutchess Co. Founder.
Klock, Charles M., St. Johnsville, Montgomery Co.
Knapp, Edwin A., Jamesville, Onondaga Co. Original.
Knapp, W. H., Union Centre, Broome Co.
Kneeland, B. T., Dalton, Livingston Co.
Kneeland, Jonathan S., Onondaga, Onondaga Co. Founder.
Kniskern, A. C., Mechanicsville, Saratoga Co.

Kuhn, William, Rome, Oneida Co.
La Bell, Martin J., Lewis, Essex Co. Original.
Laird, William R., 98 Wall St., Auburn, Cayuga Co. Original.
Lake, Albert D., Perrysburg, Cattaraugus Co.
Lambert, John, Salem, Washington Co.
Lamont, John C., Sodus, Wayne Co.
Landon, Newell E., Newark, Wayne Co. Original.
Leach, H. M., Glen, Montgomery Co. Original.
Leale, Charles A., 604 Madison Ave., New York, New York Co. Founder.
Leaning, John K., Fly Creek, Otsego Co. Founder.
Leighton, N. W., 143 Taylor St., Brooklyn, E. D., Kings Co. Original.
Le Roy, Irving D., Pleasant Valley, Dutchess Co. Founder.
Lester, Elias, Seneca Falls, Seneca Co. Founder.
Lester, Sullivan W., 381 1st St., Troy, Rensselaer Co. Original.
Lewengood, Samuel, 129 E. 84th St., New York, New York Co.
Lewis, Robert, 449 E. 118th St., New York, New York Co.
Lindsay, Walter, Huntington, Suffolk Co. Original.
Little, Frank, 135 Remson St., Brooklyn, Kings Co.
Lloyd, T. Mortimer, 125 Pierrepont St., Brooklyn, Kings Co. Original.
Lockwood, Charles E., 63 W. 36th St., New York, New York Co.
Lockwood, J. W., Philmont, Columbia Co. Original.
Long, Alfred J., Whitehall, Washington Co.
Long, Ben G., 1430 Main St., Buffalo, Erie Co.
Lukens, Anna, 1068 Lexington Ave., New York, New York Co.
Lung, Jesse B., 382 Marion St., Brooklyn, Kings Co. Original.
Lusk, William T., 47 E. 34th St., New York, New York Co. Founder.
Lusk, Zera J., Warsaw, Wyoming Co.
Lyman, Elijah S., Sherburne, Chenango Co. Original.
Lyman, H. C., Sherburne, Chenango Co. Original.
Lynch, Patrick J., 216 E. 13th St., New York, New York Co.
Lynde, Uri C., 13 Niagara St., Buffalo, Erie Co. Original.
Lyon, E. M., Plattsburgh, Clinton Co. Founder.
Lyon, George E., 6 Clinton Place, Troy, Rensselaer Co. Original.
Lyons, G. A., New Rochelle, Westchester Co. Original.
MacGregor, James R., 1037 Madison Ave., New York, New York Co.
Magee, Daniel, 116 3d St., Troy, Rensselaer Co. Original.
Maine, Alvah P., Webster, Monroe Co.
Manley, Thomas H., 302 W. 53d St., New York, New York Co. Founder.
Marsh, E. Frank, Fulton, Oswego Co.
Marsh, James P., 57 Fourth St., Troy, Rensselaer Co.
Martin, John H., Otego, Otsego Co. Original.
Martindale, F. E., Port Richmond, Richmond Co.
Martine, Godfrey R., Glens Falls, Warren Co. Original.
Matthews, David, 73 E. 54th St., New York, New York Co.

McCollom, William, 195 Lefferts Place, Brooklyn, Kings Co. Original.
McDonald, George E., Schenectady, Schenectady Co. Original.
McDougall, William D., Spencerport, Monroe Co. (San José, Cal.)
McEwen, Robert C., Saratoga Springs, Saratoga Co. Founder.
McFarland, S. F., Binghamton, Broome Co.
McGann, Thomas, Wells, Hamilton Co.
McIlroy, Samuel H., 330 Alexander Ave., New York, New York Co.
McLeod, S. B. Wylie, 247 W. 23d St., New York, New York Co. Founder.
McLochlin, James A., 401 E. 10th St., New York, New York Co. Original.
McNamara, Daniel L., Batavia, Genesee Co. Original.
McNamara, Laurence J., 126 Washington Place (West), New York, New York Co. Original.
McTammany, George H., 307 W. 28th St., New York, New York Co.
*McTammany, William F., 192 3d St., Troy, Rensselaer Co. Original.
Meacham, Isaac D., Binghamton, Broome Co.
Meier, Gottlieb C. H., 215 E. 53d St., New York, New York Co.
Menzie, R. J., Caledonia, Livingston Co. Original.
Merritt, George, Cherry Valley, Otsego Co. Original.
Miller, J. H., Centro, Los Angeles Co., Cal.
Miller, William T., 310 W. 27th St., New York, New York Co. Original.
Minard, E. J. Chapin, 243 Quincy St., Brooklyn, Kings Co. Original.
Miranda, Ramon L., 54 W. 37th St., New York, New York Co. Original.
Mitchell, Howard E., 84 4th St., Troy, Rensselaer Co. Founder.
Mitchell, Hubbard W., 747 Madison Ave., New York, New York Co. Original.
Moore, Edward M., 74 S. Fitzhugh St., Rochester, Monroe Co. Founder.
Moore, Edward M., Jr., 74 S. Fitzhugh St., Rochester, Monroe Co. Original.
Moore, Richard Mott, 74 S. Fitzhugh St., Rochester, Monroe Co. Original.
Moriarta, D. C., Saratoga Springs, Saratoga Co.
Morrell, Isaac, 218 Madison Ave., Elmira, Chemung Co.
Morrow, William B., Walton, Delaware Co.
Moyer, Frank H., Moscow, Livingston Co. Original.
Mudge, Selden J., Olean, Cattaraugus Co.
Munger, Charles, Knoxborough, Oneida Co.
Munson, J. A., Woodbourne, Sullivan Co. Original.
Munson, W. W., Otisco, Onondaga Co. Original.
Murdock, George W., Cold Spring, Putnam Co. Founder.
Murphy, John, 219 E. 37th St., New York, New York Co. Original.
Murray, Byron J., 308 W. 28th St., New York, New York Co. Original.
Murray, S. J., Pomona, Cumberland Co., Tenn. Original.
Murray, William D., Tonawanda, Erie Co. Original.
Nelson, George W., Orwell, Oswego Co.
Nelson, William H., Taberg, Oneida Co.

Newberry, John S., Columbia College, New York, New York Co.
Newman, Robert, 68 W. 36th St., New York, New York Co. Original.
Nichols, Calvin E., 57 4th St., Troy, Rensselaer Co. Founder.
Nichols, H. W., Canandaigua, Ontario Co. Founder.
Nichols, William H., West Sand Lake, Rensselaer Co. Founder.
Nicholson, A. R., Madison, Madison Co. Original.
Nicoll, Henry D., 51 E. 57th St., New York, New York Co. Founder.
Nold, John B., 165 North Ave., Rochester, Monroe Co.
North, Nelson L., 509 Bedford Ave., Brooklyn, Kings Co. Original.
Nutten, Wilbur F., Newark, Wayne Co.
Oberndorfer, Isidor P., 127 E. 64th St., New York, New York Co. Original.
O'Brien, Frederick Wm., 234 E. 112th St., New York, New York Co.
Ochs, Benjamin F., 773 Lexington Ave., New York, New York Co.
O'Hare, Thomas A., 157 State St., Rochester, Monroe Co. Original.
Oliver, William, Penn Yan, Yates Co.
Orton, John G., Binghamton, Broome Co. Founder.
Packer, Thurston, G., Smyrna, Chenango Co.
Paine, Arthur R., 99 Lafayette Ave., Brooklyn, Kings Co. Original.
Palmer, Edmund J., 131 E. 86th St., New York, New York Co.
Palmer, George M., Pike, Wyoming Co. Original.
Palmer, Henry C., cor. Genesee and Hopper Sts., Utica, Oneida Co.
Palmer, Walter B., 30 South St., Utica, Oneida Co.
Park, Roswell, 305 Delaware Ave., Buffalo, Erie Co.
Parr, John, Buel, Montgomery Co.
Parsons, Israel, Marcellus, Onondaga Co. Founder.
Parsons, John, Bailey Ave., near Kingsbridge Road, New York, New York Co. Original.
Parsons, W. W. D., Fultonville, Montgomery Co.
Pease, Joseph, Hamlin, Monroe Co.
Perry, John Gardner, 48 E 34th St., New York, New York Co.
Perry, Nathaniel M., Troupsburgh, Steuben Co. Original.
Peters, Samuel, 86 Mohawk St., Cohoes, Albany Co. Founder.
Pettit, John A., 526 S. Division St., Buffalo, Erie Co. Original.
Phelps, George G., 239 Blandina St., Utica, Oneida Co.
Pierce, Edward A., Binghamton, Broome Co.
Pierson, George E., Kirkwood, Broome Co.
Pilgrim, Charles W., State Lunatic Asylum, Utica, Oneida Co. Original.
Pohlman, Julius, Library Building, Buffalo, Erie Co.
Pollard, Abiather, Westport, Essex Co. Original.
Pooler, Hiram A., 34 Gramercy Park, New York, New York Co. Original.
Porteous, James G., Poughkeepsie, Dutchess Co. Founder.
Porter, Harry N., 1910 Harewood Ave., Washington, D. C. Founder.
Porter, P. Brynberg, 8 W. 35th St., New York, New York Co. Original.

Potter, Vaughn C., Starkville, Herkimer Co. Original.
Pray, S. R., 60 Clark St., Brooklyn, Kings Co. Original.
Preston, John R., Schuylerville, Saratoga Co. Original.
Preston, B. I., 31 Chestnut St., Rochester, Monroe Co.
Price, John H., 523 Union St., Elmira, Chemung Co. Original.
*Pryer, William C., New Rochelle, Westchester Co. Founder.
Pultz, Monroe T., Stanfordville, Dutchess Co. Founder.
Purple, Samuel S., 36 W. 22d St., New York, New York Co. Founder.
Putnam, Frederick W., Binghamton, Broome Co. Founder.
Putnam, James W., 130 Pearl St., Buffalo, Erie Co. Original.
Quin, Hamilton S., 171 Genesee St., Utica, Oneida Co.
Race, W. F., Binghamton, Broome Co. Original.
Rae, Robert, Portageville, Wyoming Co. Original.
Rand, Hannibal W., Keene, Essex Co. Original.
Ransom, H. B., 9 W. 28th St., New York, New York Co. (Burlington, Iowa.)
Rave, Edward G., Hicksville, Queens Co. Original.
Read, Ira B., 18 E. 126th St., New York, New York Co.
Reagles, James, Schenectady, Schenectady Co. Original.
Reid, Christopher C., Rome, Oneida Co.
Reynolds, R. C., Pittsford, Monroe Co. Founder.
Reynolds, Tabor B., Saratoga Springs, Saratoga Co. Founder.
Rhodes, S. D., Seneca Falls, Seneca Co. Original.
Rice, Isaac, Bloomingdale, Essex Co. Original.
Richards, Charles B., Binghamton, Broome Co. Founder.
Ricketts, Benjamin M., 93 E. 4th St., Cincinnati, Ohio. Original.
Riley, Andrew W., Au Sable Forks, Clinton Co. Original.
Risch, Henry F., 208 17th St., Brooklyn, Kings Co.
Robb, William H., Amsterdam, Montgomery Co. Founder.
Roberts, John L. D., New York Mills, Oneida Co.
Robinson, Ezra A., Jay, Essex Co. Original.
Robinson, Joseph W., Hornellsville, Steuben Co.
Rochester, Thomas M., 2 St. James Place, Brooklyn, Kings Co.
Rogers, S. Frank, 123 Vail Ave., Troy, Rensselaer Co. Original.
Roper, P. B., Alpine, Schuyler Co.
Ross, Frank W., 251 Baldwin St., Elmira, Chemung Co. Original.
Roth, Julius A., 308 E 79th St., New York, New York Co.
Rousseau, Zotique, 99 2d St., Troy, Rensselaer Co. Founder.
Rudgers, Denton W., Perry, Wyoming Co.
Ruggles, Augustus D., 59 E. 9th St., New York, New York Co.
Rulison, Elbert T., Amsterdam, Montgomery Co. Original.
Rushmore, John D., 129 Montague St., Brooklyn, Kings Co. Founder.
Russell, Charles P., 198 Genesee St., Utica, Oneida Co.
Russell, William G., 63 Lee Ave., Brooklyn E. D., Kings Co. Original.

*Sabin, Robert H., 245 Broadway, West Troy, Albany Co. Founder.
Sabin, William B., 1425 Broadway, West Troy, Albany Co. Founder.
Sabine, Gustavus A., 8 E. 24th St., New York, New York Co. Original.
Sanders, E., 126 E. 82d St., New York, New York Co.
Sawyer, Conant, Auburn, Cayuga Co. Founder.
Saxer, Leonard A., N. Salina and Union Sts., Syracuse, Onondaga Co. Original.
Sayers, Alexander, Marion, Wayne Co. Original.
Sayre, Lewis A., 285 Fifth Ave., New York, New York Co. Founder.
Sayre, Lewis Hall, 285 Fifth Ave., New York, New York Co. Founder.
Sayre, Reginald H., 285 Fifth Ave., New York, New York Co.
Schmid, H. Ernest, White Plains, Westchester Co. Original.
Schoonmaker, E. J., Magee's Corners, Seneca Co. Founder.
Segur, Avery, 281 Henry St., Brooklyn, Kings Co. Founder.
Selden, O. G., Catskill, Greene Co. Original.
Selden, Robert, Catskill, Greene Co. Original.
Seman, Frank G., Seneca Falls, Seneca Co.
Seymour, W. Wotkyns, 105 3d St., Troy, Rensselaer Co. Founder.
Sharer, John P., Little Falls, Herkimer Co. Original.
Shaw, Henry B., 21 E. 127th St., New York, New York Co.
Shepard, A. Warner, 126 Willoughby St., Brooklyn, Kings Co. Original.
Sherer, John D., Waterford, Saratoga Co. Original.
Sherman, F. J., Ballston, Saratoga Co.
Shrady, John, 66 W. 126 St., New York, New York Co.
Simmons, E. W., Canandaigua, Ontario Co. Founder.
Simons, Frank E., Canajoharie, Montgomery Co.
Sizer, Nelson Buell de S., 336 Greene Ave., Brooklyn, Kings Co. Original.
Skiff, George V., 313 W. 54th St., New York, New York Co. Original.
Skinner, Smith A., Hoosick Falls, Rensselaer Co. Original.
Small, John W., 122 Park Ave., New York, New York Co.
Smeallie, James A., Canajoharie, Montgomery Co.
Smelzer, Baxter T., Havana, Schuyler Co.
Smith, David M., Penn Yan, Yates Co.
Smith, George C., Delhi, Delaware Co.
Smith, H. Lyle, Hudson, Columbia Co. Original.
Smith, J. Lewis, 64 W. 56th St., New York, New York Co. Original.
Smith, Joseph T., Canandaigua, Ontario Co. Founder.
Smith, Marcellus R., Cincinnatus, Cortland Co. Original.
Smith, Samuel L., Smithville, Chenango Co.
Smith, Samuel W., 24 W. 30th St., New York, New York Co. Original.
Smith, Stephen, 574 Madison Ave., New York, New York Co. Original.
Smyth, Arthur V. H., Minaville, Montgomery Co.
Snook, George, Parma, Monroe Co.
Southworth, Malek A., Little Falls, Herkimer Co. Original.

Southworth, Richmond Joseph, Yonkers, Westchester Co. Original.
Spicer, Walter E., Holland Patent, Oneida Co.
Sprague, John A., Williamson, Wayne Co. Original.
Sprague, L. S., Williamson, Wayne Co.
Sprague, William B., Pavilion, Genesee Co. Founder.
Squibb, Edward H., 148 Columbia Heights, Brooklyn, Kings Co. Founder.
Squibb, Edward R., 152 Columbia Heights, Brooklyn, Kings Co. Founder.
Squire, Charles L., 409 E. Church St., Elmira, Chemung Co.
Squire, J. H., 409 E Church St., Elmira, Chemung Co.
*Steele, Charles G., 186 W. Genesee St., Buffalo, Erie Co.
Steinführer, Gustavus A. F., Schenectady, Schenectady Co.
Steinke, Carl Otho Hermann, 220 17th St., Brooklyn, Kings Co. Original.
Stephenson, F. Halleck, 101 Warren St., Syracuse, Onondaga Co.
Stephenson, James A., Scio, Alleghany Co. Original.
*Stevenson, William G., Nyack, Rockland Co.
Stockton, Charles G., 278 Franklin St., Buffalo, Erie Co.
Strong, Orville C., Colden, Erie Co.
Strong, Thomas D., Westfield, Chautauqua Co. Founder.
Stubbs, Roland H., Waterford, Saratoga Co. Original.
Sullivan, John D., 74 McDonough St., Brooklyn, Kings Co.
Sutton, George Samuel, East Fishkill, Dutchess Co. Original.
Sutton, H. C., Rome, Oneida Co.
Sutton, Richard E., Rome, Oneida Co.
Swartwout, Leander, Prospect, Oneida Co.
Sweet, Joseph J., Unadilla, Otsego Co. Original.
Sweet, Joshua J., Unadilla, Otsego Co.
Sweetman, J. T., Jr., 1 Clinton Place, Troy, Rensselaer Co.
Taylor, Isaac E., The Shurburne, Fifth Ave. and 36 St., New York, New York Co. Founder.
Taylor, John H., Holley, Orleans Co. Original.
Tefft, Charles B., 8 Henry St., Utica, Oneida Co.
Thayer, William Henry, 171 Livingston St., Brooklyn, Kings Co. Original.
Thomas T. Gaillard, 600 Madison Ave., New York, New York Co. Founder.
Thompson, R. A., Norwich, Chenango Co.
Thornton, William H., 574 Niagara St., Buffalo, Erie Co.
Todd, John B., Parish, Oswego Co.
Tompkins, H. C., Knowlesville, Orleans Co. Founder.
Tompkins, Orren A., East Randolph, Cattaraugus Co. Original.
Townsend, Morris W., Bergen, Genesee Co. Founder.
Traver, Richard D., 14 Fourth St., Troy, Rensselaer Co. Original.

Travis, Edward M., Masonville, Delaware Co.
Tremaine, Wm. S., 449 Washington St., Buffalo, Erie Co. Founder.
Tripp, John D., Virgil, Cortland Co. Original.
Truax, J. G., 17 E. 127th St., New York, New York Co.
Trull, H. P., Williamsville, Erie Co.
Tucker, Carlos P., 43 W. 26th St., New York, New York Co. Founder.
Tully, A. Melville, 205 North State St., Chicago, Ill. Original.
Turner, Melvin H., Hammondsville, Essex Co. Original.
Ure, Heman D., Wampsville, Madison Co.
Vanderhoof, Frederick D., Phelps, Ontario Co. Original.
Vanderveer, J. R., 301 Carlton Ave., Brooklyn, Kings Co.
Van de Warker, Ely, 104 Fayette Park, Syracuse, Onondaga Co. Founder.
Van Fleet, Frank, 124 E. 81st St., New York, New York Co.
Van Hoevenberg, Henry, Kingston, Ulster Co. Original.
Van Vranken, Adam T., 1603 3d Ave., West Troy, Albany Co. Original.
Van Wagner, L. A., Sherburne, Chenango Co.
Van Wyck, Richard C., Hopewell Junction, Dutchess Co. Original.
Van Zandt, Henry C., Schenectady, Schenectady Co. Original.
Vaughn, Frank O., 249 Swan St., Buffalo, Erie Co. Original.
Vincent, Ludger C., 52 W. 26th St., New York, New York Co.
Wagner, Charles Gray, State Lunatic Asylum, Utica, Oneida Co.
Wakely, Benjamin C., Angelica, Alleghany Co. Original.
Wales, Theron A., Elmira, Chemung Co. Original.
Wallace, Edwin E., Jasper, Steuben Co.
Wallach, Joseph G., 159 E. 62 St., New York, New York Co. Original.
Walser, William C., Port Richmond, Richmond Co.
Walsh, Simon J., 22 City Hall Place, New York, New York Co.
Ward, Charles S., 30 W. 33d St., New York, New York Co. Founder.
Ward, R. H., 53 4th St., Troy, Rensselaer Co.
Ward, Stanley M., Ellenville, Ulster Co. Original.
Warner, John W., 107 E. 72d St., New York, New York Co.
Webb, Edwin, Hempstead, Queens Co. Original.
Wells, E. H., Binghamton, Broome Co.
Wells, William L., New Rochelle, Westchester Co. Original.
West, Joseph E., 171 Genesee St., Utica, Oneida Co.
West, M. Calvin, Rome, Oneida Co.
Westen, Albert T., 35 Charlton St., New York, New York Co.
Wheeler, Isaac G., Marilla, Erie Co.
White, Whitman V., 1522 Park Ave., New York, New York Co. Founder.
White, William T., 130 E. 30th St., New York, New York Co. Founder.
Whitford, James, Onondaga Valley, Onondaga Co. Original.
Wieber, George, 181 S. 5th St., Brooklyn, Kings Co. Original.
Wiener, Joseph, 150 E. 61st St., New York, New York Co. Founder.

Williams, William H., 207 17th St., Brooklyn, Kings Co. Original.
Willoughby, M., 1335 Main St., Buffalo, Erie Co.
Williamson, Edward A., Westchester Road, Westchester Co.
Wilson, Thomas, Claverack, Columbia Co. Founder.
*Winship, Cornelius A., Eagle Mills, Rensselaer Co. Original.
Wood, Charles S., 171 W. 47th St., New York, New York Co. Founder.
Woodend, William D., Huntington, Suffolk Co. Founder.
Woodward, C. H., Batavia, Genesee Co.
Woodworth, T. Floyd, Kinderhook, Columbia Co.
Wyckoff, Cornelius C., 482 Delaware St., Buffalo, Erie Co. Founder.
Wyckoff, Richard M., 532 Clinton Ave., Brooklyn, Kings Co. Founder.
Wyeth, John A., 267 Madison Ave., New York, New York Co. Original.
Young, Augustus A., Newark, Wayne Co. Original.
Young, John, Fishkill-on-Hudson, Dutchess Co. Original.
Young, John D., Starkville, Herkimer Co. Original.
Young, Oscar H., Sidney Centre, Delaware Co. Original.
Young, William, Cold Spring, Putnam Co. Founder. Total, 681.

Of 164 Founders, 136 remain on the list; of 286 Original Fellows, 265 remain on the list.

(*) An asterisk prefixed to the name of a Fellow indicates that he is dead.

TABLE OF DECEASED FELLOWS

DECEASED FELLOWS.

Name.	Age.	County.	Place of Birth.	Date of Death.	Medical College.	Year of graduation
Adams, John G.	77	New York	New York city	June 19, 1884.	Coll. Phys. and Surg., N. Y.	1830
Andrews, John S.	61	Kings	Bristol, Conn.	Jan. 3, 1889.	Univ. City of New York.	1849
Avery, George W.	61	Chenango	Earlville, N. Y.	Nov. 1, 1888.	Albany Medical College	1850
Ayres, Alexander	74	Montgomery	Oppenheim, N. Y.	Aug. 27, 1886.	Castleton, Vt.	1842
Barker, A. M.	37	Erie	Kendall, Orleans Co., N. Y.	Dec. 6, 1887.	University of Buffalo	1877
Church, Allen S.	62	New York	Great Barrington, Mass.	Oct. 24, 1884.	Castleton, Vt.	1848
Clark, Alonzo	80	New York	Chester, Mass.	Sept. 13, 1887.	Coll. Phys. and Surg., N. Y.	1835
Coit, William N.	52	Clinton	Plattsburgh, N. Y.	Aug. 4, 1886.	University of Pennsylvania	1856
Collins, Isaac G.	53	Westchester	Granville, N. Y.	Dec. 18, 1885.	Albany Medical College	1858
Collins, Thomas B.	61	Monroe	Mendon, N. Y.	Feb. 17, 1888.	Jefferson M. C., Philadelphia	1851
Cornell, F. O.	29	Montgomery	Glenville, N. Y.	Dec. 3, 1884.	Albany Medical College	1880
Cotes, J. R.	54	Genesee	Batavia, N. Y.	Mar. 20, 1884.	Med. Dep. Univ. Buffalo	1852
Davidson, John	91	Queens	New York city.	Dec. 26, 1884.	Lic. N. Y. St. Med. Soc.	1829
De La Mater, S. G.	73	Schenectady	Bethlehem, Alb. Co., N. Y.	June 23, 1888.	Albany Medical College	1842
Flint, Austin	73	New York	Petersham, Mass.	Mar. 13, 1886.	Harvard Med. Coll.	1833
Flood, Patrick Henry	72	Chemung	Pennsylvania	Mar. 12, 1886.	Geneva Med. Coll.	1845
Fuller, Winfield S.	48	Monroe	Walworth, N. Y.	Jan. 13, 1888.	College of Phys. and Surg., N.Y.	1861
Gay, Charles C. F.	66	Erie	Pittsfield, Mass.	Mar. 27, 1886.	Berkshire Med. Coll.	1846
Gray, John Perdue	61	Oneida	Half Moon, Pa.	Nov. 29, 1886.	University of Pennsylvania	1849
Gray, John W.	53	Livingston	America.	April 17, 1886.	University of New York	1856
Griswold, Gaspar	29	New York	New York city	Mar. 4, 1886.	Bellevue Hospital Med. Coll.	1878
Guernsey, Desault	55	Dutchess	Wilton, N. Y.	Dec. 9, 1885.	Coll. Phys. and Surg., N. Y.	1850
Hall, H. C.	41	Broome	America.	June 1, 1887.	Univ. of New York, Med. Coll.	1869
Hall, John E.	38	Albany	New Marlboro', Mass.	Nov. 3, 1886.	Albany Med. Coll.	1877

Hamilton, Frank H.	73	New York	Wilmington, Vt.	Aug. 11, 1886.	University of Pennsylvania	1835
Hinds, Frederic J.	32	Washington	East Greenwich, N. Y.	April 26, 1887.	Bellevue Hospital Med. Coll.	1876
Hollister, Edwin O.	41	Ontario	Batavia, N. Y.	Oct. 8, 1887.	Bellevue Hospital Med. Coll.	1874
Hutchison, Joseph C.	60	Kings	Old Franklin, Mo.	July 17, 1887.	University of Pennsylvania	1848
Hyde, Frederick	80	Cortland	Whitney Point, N. Y.	Oct. 15, 1887.	Fairfield Med. Coll.	1836
King, James E.	66	Erie	Warren, Pa.	Jan. 21, 1888.	Buffalo Medical College	1848
Knapp, John H.	67	Cortland	New Fairfield, Conn.	April 30, 1886.	Chenango County Med. Soc. Geneva Med. Coll.	1843 1861
Lauer, Eugene	40	New York	Germany	Oct. 31, 1886.	Giessen and Marburg.	1868
Linsly, Jared	84	New York	Northfield, Conn.	July 12, 1887.	Coll. Phys. and Surg , N. Y.	1829
McClellan, Christopher R.	73	Kings	Maryland	Jan. 13, 1887.	University of Maryland	1835
McTammany, Wm. F.	36	Rensselaer	Troy, N. Y.	July 21, 1888.	Bellevue Hospital Med. Coll.	1880
Moore, Joseph W.	47	Albany	Troy, N. Y.	Sept. 9, 1886.	Castleton, Vt.	1859
Pask, William	55	Erie	England	Aug. 24, 1884.	Med. Dep. Univ. Buffalo	1884
Peck, M. R.	62	Warren	Sand Lake, N. Y.	April 4, 1884.	Albany Med. Coll.	1851
Pomeroy, Charles G.	71	Wayne	New York	Dec. 14, 1887.	Ontario County Med. Soc. Jefferson Med. Coll.	1837 1850
Pryer, William Chardavoyne	54	Westchester	New York city	Sept. 24, 1888.	Coll. Phys. and Surg., N. Y.	1862
Purdy, Isaac	57	Sullivan	Walkill, N. Y.	Dec. 6, 1885.	Castleton, Vt.	1851
Ring, William	63	Erie	United States	April 20, 1887.	University of Buffalo	1848
Rochester, Thomas F.	63	Erie	Rochester, N. Y.	May 24, 1887.	University of Pennsylvania	1848
Sabin, Robert Hall	56	Albany	Saxton's River, Vt.	Dec. 4, 1888.	Albany Med. Coll.	1856
Slack, Henry	57	Dutchess	Albany, N. Y.	Dec. 10, 1886.	Albany Med. Coll.	1852
Slocum, J. O.	65	Onondaga	Pompey, N. Y.	Mar. 3, 1885	Castleton, Vt.	1846
Steele, Charles G.	27	Erie	Buffalo, N. Y.	Feb. 12, 1888.	University of Buffalo	1886
Stevens, Frederick P.	31	New York	Ithaca, N. Y.	Dec. 4, 1884.	Bellevue Hospital Med. Coll.	1877
Stevenson, William G.	44	Rockland		Feb. 3, 1888.	Bellevue Hospital Med. Coll.	1864
Winship, Cornelius A.	62	Rensselaer	Litchfield, Conn.	Feb. 14, 1888.	Albany Medical College	1858

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